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Costs

Profit is the difference between cost to you and cost to your customer. Lots of plumbers and steam-fitters never know the **difference.** For them, profit does not exist. These are the kind of people who will hire an automobile for an outing and not understand that the automobile-owner, with an investment of $2,000, paying his chauffeur 20 cents an hour and charging $5.00 an hour, is making money.

Just between ourselves, **what are you working for? Profit? Or living expenses?** If living expenses, quit reading this right now. You will be wasting time and may miss the chance of adding another loaf of bread to the domestic larder.

You are working for profit? Yet you say you have not made any and do not understand why. You have been busy all the year through, but now and then you have to hustle the collections to meet pay-day requirements and you wince whenever the children talk about vacation or the wife says that all hands want new dresses. The cause, my good fellow, is Costs. Merciless costs! Inexorable costs! Implacable, unyielding, inflexible costs!

A knowledge of costs is the first step to doing a profitable business. The man who says: "I don't keep a cost-system because, you know, my business is only a small one," is a plain, ordinary garden-variety of fool. There's no back answer to that. He is on a par with the man who was afraid to put in a cost-system because he dreaded that it would show his costs to be so high that he could not meet competition and would lose his business.

If every plumber and steam-fitter knew exactly how much profit he made day by day, what department of his business made the most money and why it made it; if he knew all the different final costs of each job he did, he would have grit enough and knowledge enough to determine the cost the customer should pay. When he said to the client, "That will cost you $725," the ring in his voice would convince the man that that price was a just and equitable one based on knowledge of costs. On the other hand, when a man figures up a few manufacturers' prices, makes a lightning stab at labor-costs and a feeble bunt at something possibly to the good at the end, he says, "Tha-a-t should—cost—you— — er—$725," in a tone of voice that is apologetic and suggests "of course, if you think it is too high, we can bring the price down considerable." That's a swell start for there being something left over at the end, is it not?

One thing you may be sure of. The man who is buying from you will naturally buy as low as he can but he can't buy below certain prices, definitely established by a knowledge of costs, any more then he could afford to give you $6.00 for a $5.00 bill. There is a limit even to price-cutting. **Price-cutting is a crime, no matter how you look at it. In legitimate business, there is room only for price-making.**

Any fool can cut a price. Knowledge and business courage are required to make a price. There's an old English saying which runs: "There's none so funny as folks." It's true, too. Take, for instance, the case of a journeyman plumber or steam-fitter, a union man, who will go out on strike for months at the slightest sign of reduced wages or increased hours and who, becoming a master, will scour the highways and byways of commerce, to market his services at the lowest securable price. Able in his journeyman state to change his lodgings at will, defy landlords and collection-agents and choose employers and conditions of labor, as a master he dances to the tunes of the grocer, baker, landlord and contractor, and declares "Times are hard." He has assumed responsibility without an adequate knowledge of costs.

The writer sat at lunch the other day with a master plumber, a good fellow, but possessed of a wondrously grievous tale. It ran something along these lines:

"The business just now is rotten. It's a joke. Look at some of the figures in this book and note the prices I have had to quote to get the jobs I am doing. There's less profit in them than if I ran a shoe-shining stand. The prices these other fellows quote would drive a man to drink. Do I belong to the local association? Sure, but I don't get up there

more than two or three times a year. Of course, I pay my dues for I believe in association, but there are some pretty black sheep in that bunch, and the only time I meet them is when I'm figuring against them."

There you have it in a nutshell. He **believes in association,** pays for its privileges and **does not associate.** What kind of business insanity is this? What would you think of a man who paid for a 75-cent meal and did not even sit down at the table? The same type of man believes that a man should get a proper price for his work but does not even take 15 minutes each day to study his menu of costs. He thinks he knows, and places the blame on others because the results do not tally with his thinking.

The last time we wrote on price-cutting, one of our readers took exception to some general statement we made. He asked if it was fair to class as price-cutters a man who, by superior knowledge of ways and means, was able to quote a lower price than others. On the surface, it might look as though he was cutting the price but in reality he was making a greater profit than the highest bidder.

Of course, such a man is not a price-cutter. He is, however, a curiosity. The evils in the trade are not caused or brought about by those whose extraordinary knowledge enables them to figure more closely than others. Our correspondent states that a generous profit was made and taking his word for it, though no figures were given, a profit-maker is not a price-cutter.

He who knows not his cost of doing business and knows that he knows not will unsettle business every now and then, but you may have hopes of his advancement.

He who knows not his cost of doing business and knows not that he knows not is a man to be watched, a dangerous, foolhardy and subtle competitor.

He who knows his business and the cost of running it and throws his knowledge to the four winds of heaven when bidding, is the rankest kind of an idiot.

He who knows his business and the cost of running it, and adds to his knowledge daily and uses that knowledge in the making of his prices, is a wise man, a good competitor, a man to be trusted and a good friend to have.

We must class ourselves under one of these four heads. The classification may be painful but it will be salutary. Remember that you state you are working for profit and that **profit is the difference between cost to you and cost to your customer.** Recollect also that **"Costs" includes more than cost of materials, labor and overhead expense.**

Knowledge is proud that it knows so much; Wisdom is humble that it knows no more.

NEW ENGLAND NOTES.

Massachusetts.

Boston.—Major John F. Fitzgerald has approved a contract with J. J. Hurley & Co., for setting and piping up boilers in the Hyde school for the contract price of $2,292. Other bids for the work were as follows: Pierce & Cox, $2,295; Hern-Furlong Co., $2,825; Laskey & McMurrer, $3,248; P. J. Sullivan, $3,150.

Lowell.—Antonio Cadorette has opened a plumbing establishment at 69 Cabot St.

Salem.—Reuben E. Dockham has removed his plumbing business from the former location at the corner of North and Federal streets to 39 North St.

Taunton.—The plumbing business of John O'Hare, formerly located on West Water street, Weir Village, is now to be found at 3 Plain St.

Lynn.—A. F. Randall has sold his interest in the plumbing business to Bernard T. Thompson and Greenfield T. Libby, who will conduct the business in the future under the firm name of Thompson & Libby. They are located at 39 Buffun St.

Pittsfield.—The firm of Collins & Dean, plumbers and gasfitters, of 37 West St., has been dissolved and the business is being continued by Mr. Collins under the firm name of James Collins & Co.

Boston.—W. W. Campbell & Son, heating and ventilating engineers and contractors, have removed from 60 Pearl St., to 49 Haverhill St.

Amherst.—James Wiley, a plumber in the employ of Amherst College, was electrocuted a few days ago when he came in contact with a live wire while putting up conductors on the college chapel.

Boston.—Articles of incorporation have been filed with the secretary of state by the Daniel E. Walsh Co., of this city. The concern will deal in heating apparatus. The incorporators are Daniel E. Walsh, William A. Walsh and George L. Ellsworth.

Newburyport.—The plumbing establishment of Ralph W. Nelson on Merrimac St., was slightly damaged by fire a few days ago. The fire was due to the lighting of a match by an employee too near a quantity of oakum.

Pittsfield.—Robbins & Gamwell have the contract for the steam heating in the new house of Charles W. Power in South street.

Amherst.—Allen, Woodward & Co. have the contract for plumbing Dr. W. J. Beal's handsome new residence on Sunset avenue.

New Hampshire.

Portsmouth.—Plumber John H. Cornelius is one of the three candidates for the vacancy which exists on the board of public works.

Nashua.—Fred T. Buxton, successor to Buxton & Allard, has a number of important plumbing and heating contracts in hand at the present time. Among them are the following: Steam heating and plumbing in the parochial school of St. Xavier parish; plumbing in Shea block; steam heating in residence of E. T. Lawrence; plumbing and steam heating in the residence of Harley Mastic; plumbing in residence of Frank Newton; steam heating in residence of Mrs. Frank Arnold; plumbing and steam heating in residence of E. B. Saunders; hot-water heating in the apartment-house of Victor St. Onge, and plumbing in the residence of Frank E. Anderson. All of the above are in Nashua. In addition Mr. Buxton is to install heating plants in the greenhouses of Carl R. Lloyd at Plaistow and John F. Harvey at Pittsfield.

Connecticut.

Waterbury.—Work has been started on changes to the sanitary arrangement and equipment at St. Mary's school. M. J. Daly & Sons are doing the plumbing and heating work.

Fairfield.—George Rock has taken charge of the plumbing business of his brother, Daniel Rock, recently deceased.

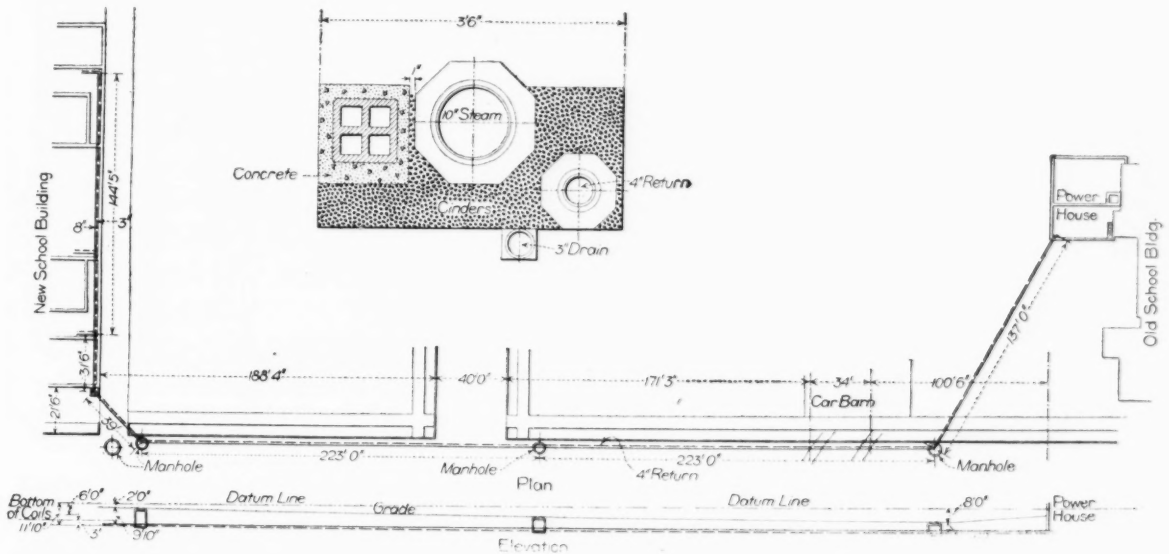
East Haven.—Harold Holbrook, a recent graduate of the plumbing department of the New York Trade School, has accepted a position as instructor in the David Rankin School in St. Louis, Mo., where he will teach plumbing. He assumes his new duties early in September.

Middletown.—The contract for plumbing and heating the new residence to be erected for Dr. C. B. Chedel in Portland has been placed with Bacon Bros. of this town.

Heating and Ventilating High School Buildings at Decatur, Ill.*

By Samuel R. Lewis, Chicago

The object of this paper is to outline the scheme of heating and ventilating a new school-house building in Decatur, Ill., and the remodelling of the heating and ventilating apparatus in an established high-school building together with the scheme followed for supplying both buildings with steam for heating and with electric light and power from a central point. The new building is about 500 ft. distant from the old building, which was formerly heated by 10 warm-air furnaces. The ground space for the new building and its surroundings made it desirable to eliminate from it any boiler-plant, and the fact that the furnaces in the old building were worn out at the time of the designing of the new building rendered it necessary to install new heating and ventilating apparatus there. The old building is of non-fireproof construction, hence it was proper to remove all fire from



Underground Conduit for Supplying Heat and Electricity to the New School Building.

within it. The new building was to be completed in the spring of 1911. The old building had been provided with a new plant in the fall of 1909. These considerations prompted the location of the power-house adjacent to the old building, especially as coal-storage space could be obtained under it, and it would be possible to provide enough capacity to handle the old building through the winter at minimum cost.

It was planned to provide the most efficient and economical type of apparatus known, with ventilation of all rooms up to at least 30 cu. ft. of air per minute per pupil, with new sanitary apparatus, all of the ventilated type, and power for fan propulsion, lighting and manual training machinery in both buildings. Steam, return and electric conduits were permitted under the streets by special arrangement with the city.

It was decided to install the indirect type of heating, well governed by automatic regulation, as being the most positive and sanitary, as well as economical. Prominent advantages of this system are:

1. It is ordinarily difficult or impossible to hold school without running the fans and securing ventilation.

2. The pupils in a given room are all subject to the same temperature and some are not overheated, as they must be when direct radiators are placed in the rooms.

3. The trouble and noise of air-valves and steam and water circulation in the radiators are eliminated.

4. The false-air-circulation by direct radiators destroying diffusion of the fresh air is eliminated.

5. The author has always found the all-indirect plants to be more economical of fuel.

The following data may be of interest:

Chicago: Five schools, with both indirect and direct heating, all of about the same size, averaged per cu. ft. of space heated and ventilated per season 1.11 lb. of coal. Five other schools of approximately the same size, burning the same kind of coal in the same sort of boilers, but having entirely indirect heating, averaged per cu. ft. of space heated and ventilated per season only 0.67 lb. of coal.

Kansas City: The manual training high school, having both indirect and direct heating, cost in fuel for the year 1909-10, per cu. ft. of space heated and ventilated 0.273 cent. The Westport high school, having entirely indirect heating, cost in fuel for the same year per cu. ft. of space heated and ventilated 0.124 cent. Both buildings burn oil in similar boilers.

In the Decatur plant direct radiation is used in all toilets, offices, corridors or rooms with plumbing which might be injured by excessive cold. The advantage of having direct radiation in class-rooms is that it tends to keep them warm when the fans are not in operation, provided they are furnished with steam. At Decatur the buildings

*Paper read at the Summer Meeting of the American Society of Heating and Ventilating Engineers, held at Chicago, July 6-8, 1911.

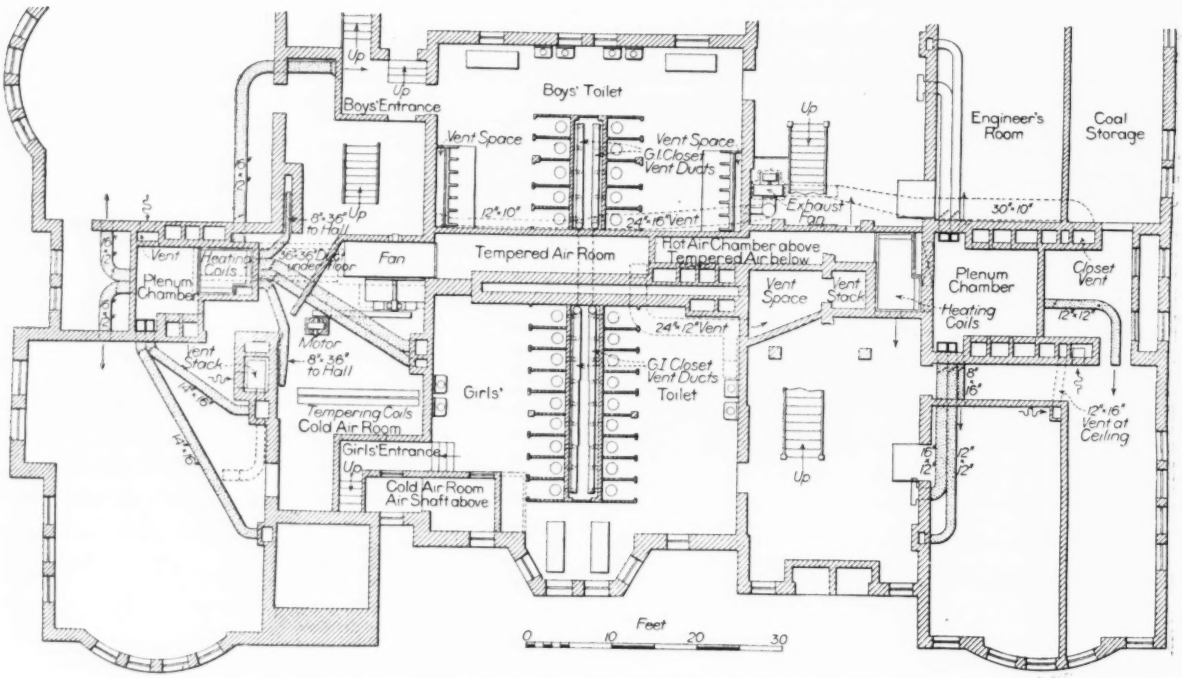
were arranged in such a manner that it was possible to group the indirect radiation in small chambers near the banks of flues, and thus by gravity-air-circulation keep the rooms reasonably warm without any direct radiation when the fans were not in operation. This has proved in practice to work out with remarkable success.

The boiler-house is a fireproof building, containing three high-pressure horizontal tubular boilers of 450 rated h. p., with standard equipment for bituminous coal. In a room adjoining the boilers are located the feed-water heater, boiler feed pumps, all main operating valves, pressure regulator, etc. and two horizontal turbine-generators, with the accompanying switchboards. The distribution lines for steam, compressed air and electricity center in this room. The generators are for 250-volt direct current, and one is of 75 kw., the other of 50 kw. capacity. Together they have ample power to carry all of the lights and power in both buildings at one time. In actual practice, however, the peak load never has overtaxed the smaller machine.

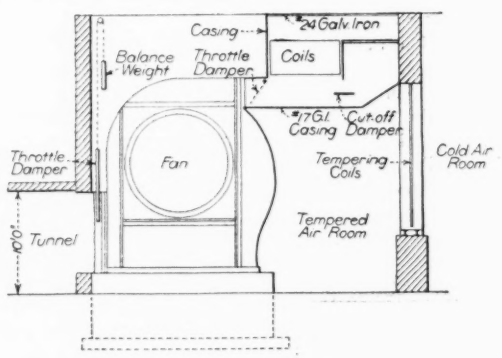
It is admitted that the turbines are not as economfcal of steam as would be reciprocating engines, but the fact that the plant is in service practically at no time when heat also is not required, and that therefore the electricity is practically a by-product, disposes of this argument. The turbines are practically noiseless, have a very long life, require no internal lubrication, thus relieving the boilers of oil, and they occupy very little space. The feed-water heater is of only 150 h. p., being used merely to purify the make-up water, or to supply one boiler when exhausting to the atmosphere in warm weather, when the plant might be in operation for power or lighting.

To the old building are run a 7-in. steam line and a 2½-in. wet return. To the new building in a common trench, running about 650 ft. and from 4 to 12 ft. underground, are carried a 10-in. steam and a 4-in. wet return, in tin-lined Wyckoff insulation, and a four-part vitrified tile electric conduit, as shown. The main to the new building pitches upward from boiler house, and as it is below the receiver, the condensation in it is raised to the receiver by a tilting trap. Proper expansion joints and anchorages are inserted, the former accessible in brick manholes.

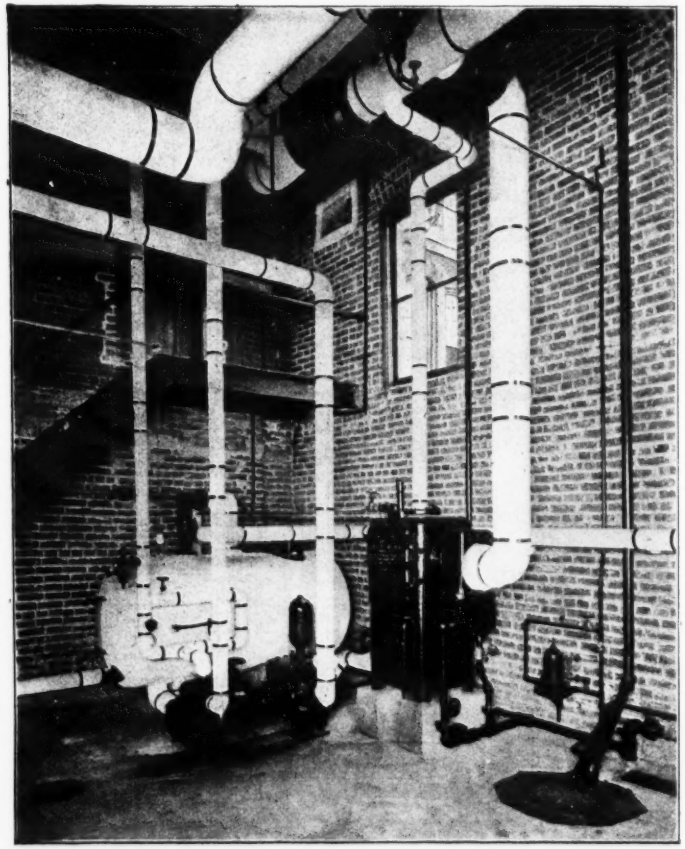
In the old high-school the supply fan is a special Sirocco wheel driven by a belted 15-h. p. motor, delivering tempered air to horizontally placed reheating coils in plenum chambers directly at the bases of the flues. Fresh air is drawn from the second-story level. All toilet-rooms have special closets, with large rear local vent openings, and all urinals are locally vented, being connected by metal ducts with an exhaust fan, which is driven by a direct connected 2½-h. p. motor. New flues of tile supplement the old flues and in the attic are placed cut-off dampers in all vent flues for shutting off the ventilation when the building is not occupied. This is effected by compressed air from the engine-room.



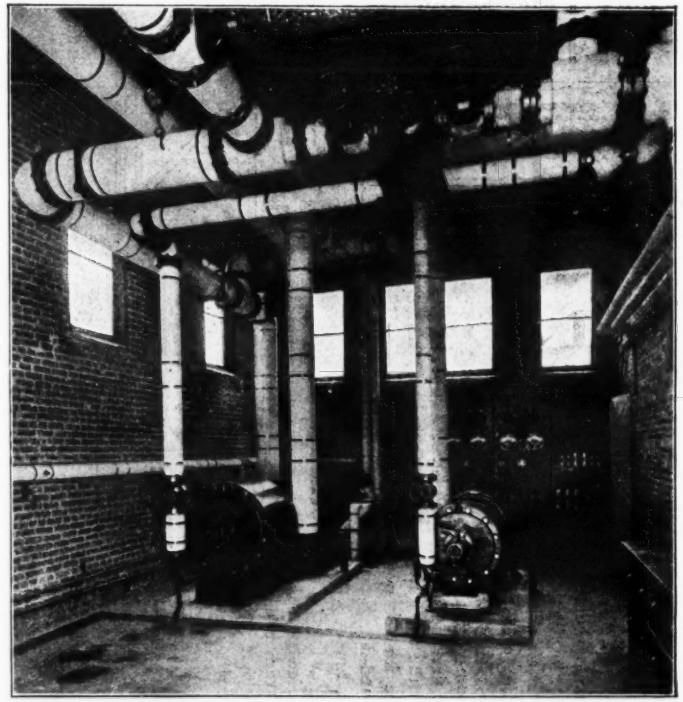
Remodeled Scheme of Heating and Ventilating in Old School Building.



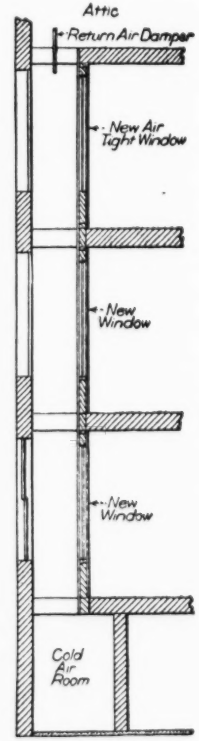
Details of Fan-Room in New Building Plant.



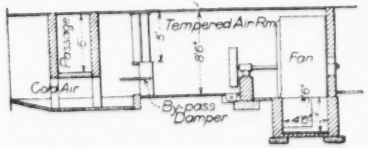
Auxiliary Apparatus and Piping in Power-House.



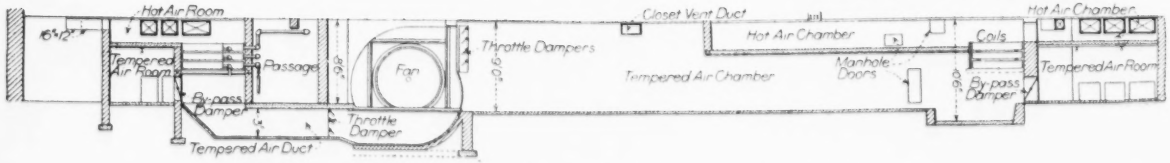
Steam Turbines and Piping in the Power-House.



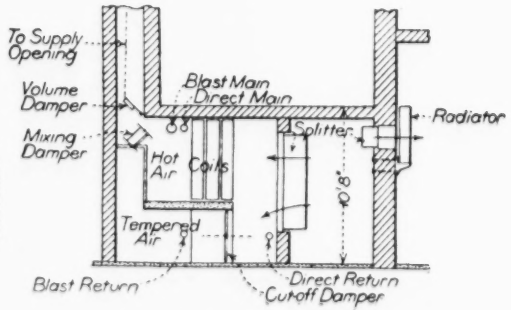
Air-Intake, Old Building.



Air Passage to Fan, Old Building.



Sectional Elevation through the Remodeled Heating and Ventilating Plant.



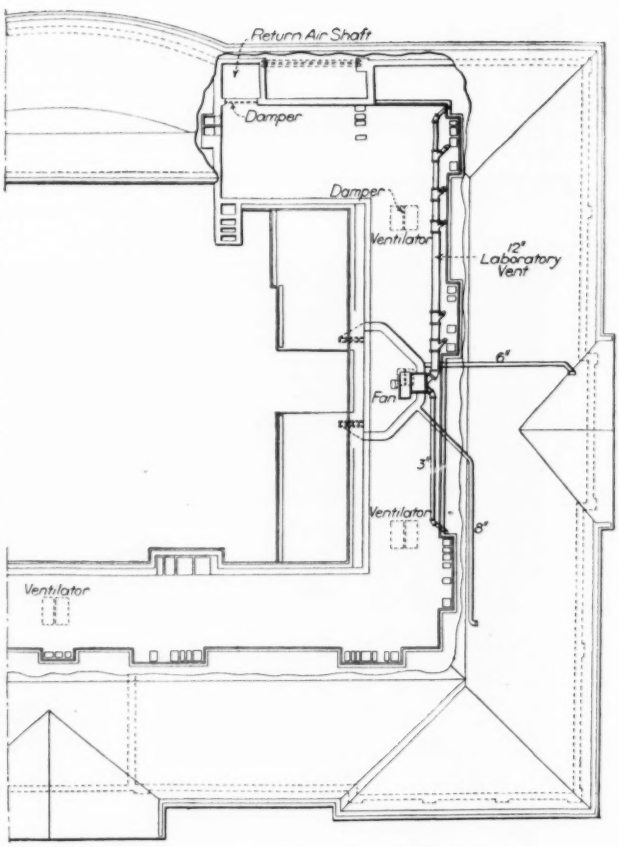
Details of New Building Plant.

All class-rooms have automatic temperature regulation, the thermostats gradually moving mixing dampers in the plenum chambers, without curtailing the volume of air, merely changing its temperature as required. Cumulative devices are installed, by means of which the power of the entire plant finally goes to the slowest room to reach 70 deg. when warming the building in the morning. On all side-wall air-supply openings are placed adjustable diffusers, by which the air current may be deflected to any part of each room. There are no vent-screens or registers in the new building, the ventilation outlets being finished as far as visible like the rooms, and thus they are swept out every day.

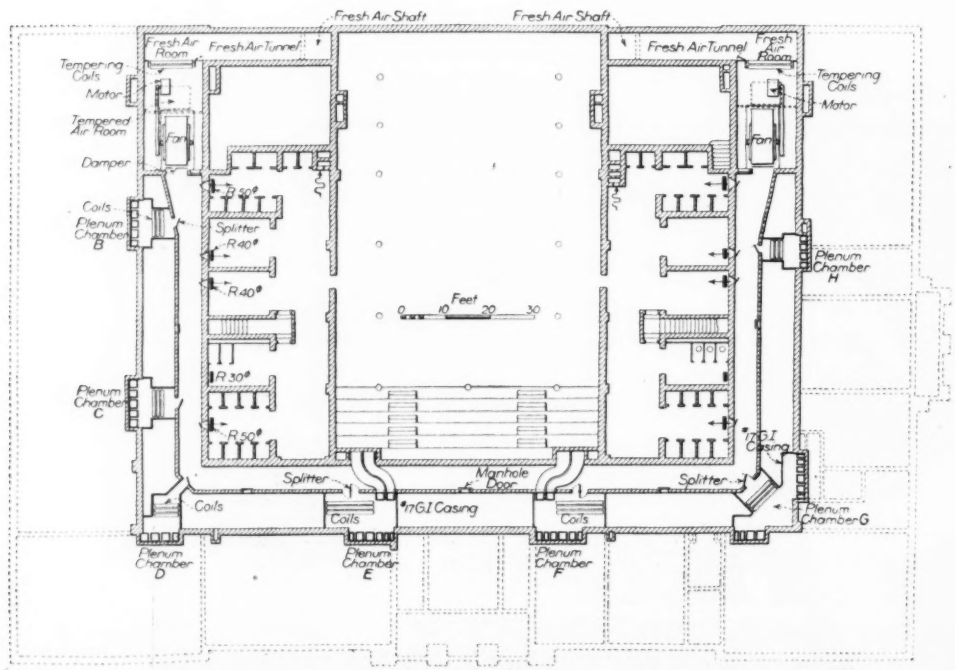
The old high-school building has an air delivery of 43,000 cu. ft. of air per minute, and about 3,600 sq. ft. of indirect radiation. The air blown into the corridors finds its way out through the toilet-rooms, through the locally vented fixtures, and thus there is always a greater air pressure in the former than in the latter, effectually preventing odors from toilets anywhere in the building. The toilet-ventilation is entirely separate from the room-ventilation.

The new high-school was naturally an easier and more symmetrical problem, but the description of the apparatus in the old building will very nearly suffice for the new one. The fresh air is drawn from the second-floor level, tempered and delivered by the fans into a tunnel which extends under the center of the corridor, around three sides of the building. In this tunnel are nine groups of reheating coils and all of the piping for steam and condensation. The tunnel is of ample size without affecting the balance of the building. The supply-fans are Sirocco wheels in double discharge housings propelled by 20-h. p. belted motors. The building receives 12,000 cu. ft. of air per minute, and there are about 9,000 sq. ft. of indirect radiation.

Exhaust fans for toilet and chemical-table ventilation are placed in the attic. Together they have a capacity of



Exhaust and Return Circulation in New Building.



Basement Plan of New Building Showing Heating and Ventilation Scheme.

150,000 cu. ft. air per minute and have 8-h. p. motors. The chemical-laboratory ventilation is carried in vitrified tile pipes, and the fan which handles the fumes is of special corrosion-resisting construction. A large, tight foul-air chamber is formed in the roof space, from which the foul air escapes through ventilators, equipped with compressed-air controlled dampers.

In both the old and new buildings the foul-air chambers in the attic may be thrown in connection with the fresh-air intake flues, thus forming a closed circuit, through which the air may be recirculated over and over positively, and a substantial fuel saving is thus effected when warming the building prior to occupancy.

Each room has in its supply-flue a volume damper, operated from the back of the diffuser in the room, but located in the inlet to the flue in the basement. This arrangement is of great convenience when adjusting or testing the air distribution, besides eliminating any unauthorized manipulation of the dampers, as is common with the ordinary type.

The locker and shower-rooms in the sub-basement of the new building and all corridors have both direct radiation and air supply from the indirect system. Whenever possible the air is delivered through or against the direct radiation, thus increasing its efficiency about three times and preventing local circulation.

What is the Matter With Modern Heating Practice?

The Answer of an Expert to the Agitation Against Present Methods*

By Konrad Meier

There is a widespread feeling that the modern ways of heating, though more efficient, are not as healthy as the open fire-place, the Dutch tile oven, or even the ordinary stove. Evidently, there must be some basis for this contention. We need only remember that the close, lifeless air and stuffiness too often met in buildings heated by boiler or furnace cannot always be traced to crowded occupation. Nor can it be the failure to use the windows, inasmuch as the desire to open them is rather induced, sometimes almost compelled, by these conditions. Another significant fact is that the demand for ventilation has only arisen since hot-air registers and radiators have become general. No further evidence is necessary for the general conclusion that present day methods of heating in some way spoil the air, but it is worth while to look further into cause and effect in order to find the right means of prevention.

The Vitiation of Air by Heating.

At first thought there seems to be no reason why a steam-heating apparatus, or a hot-air furnace in good condition, should alter the quality of the room air, aside from an unavoidable drying effect, not necessarily objectionable in itself. Nevertheless, on closer investigation some distinct causes of vitiation, not recordable by the ordinary methods of air testing, have been shown to exist, and found to create unwholesome conditions. We are indebted especially to two noted German hygienists, von Esmarch and Fluegge, for their investigations on this elusive subject. They have established that the stuffiness of air in heated rooms is caused by the decomposition of dust in contact with radiating surfaces at temperatures of 160 deg. F. and higher.

This process is not one of full combustion, generating carbonic acid, but a sort of dry distillation or singeing of the organic matter, which produces small quantities of the highly injurious ammonia, also traces of carbon monoxide and other gases. The presence of the former gas is explained by the quantities of animal excreta, one of the principal ingredients of ordinary street-to-house dust. It shows the little appreciated fact that dust, while comparatively harmless on furniture, will become objectionable when allowed to settle and decompose on radiators.

The gases thus generated are most noticeable after a period of interrupted heating. Under continuous service the quantities are generally too small for detection. But, in addition to this variable pollution, a constant irritation of the mucous membrane of nose and throat is kept up through the simple drying of the dust on heating surfaces, which lightens it and causes it to be picked up freely by the warm air currents. Even the dust on adjacent objects, also in ducts and air chambers, is dried and joins the procession of irritant, disease-bearing particles induced by the common forms of modern heating.

The meaning of this is plain when we remember that the dry heat is not sufficient to kill the bacteria carried by the dust, and that we inhale them in much greater numbers owing to the currents of air created by heaters, more especially those with unsanitary surfaces. It is also the presence of fine dried dust which is often responsible for complaints from dryness. The real cause is not dryness of air, but dried dust. Pure dry air has never been shown to be harmful. It has also been established that whatever little ozone may enter a room with the outer air is quickly used up in contact with organic dust, especially when heated. A small percentage of oxygen is absorbed in the same manner, but the extent and exact bearing of this fact has not yet been determined. These last points alone would account for the lifeless quality of the air as it generally issues from a register.

When these factors are considered, it will be admitted that an open grate, carrying its own vitiation up the flue, or a tile oven with clean, moderately warm surfaces, or even an iron stove kept polished, could not vitiate the room air to the same extent as will a radiator with inaccessible dusty surfaces, or a register blowing hot air from a musty source beyond inspection.

All this is not meant to advocate a return to the old-fashioned ways of heating, but only to show that the newer methods are actually at fault, and should be improved along lines suggested by the recent findings of hygienists. The result eventually will be a merging of the good features of past and present methods.

*From "The Heating and Ventilating Magazine," N. Y. City.

Sanitary Heating.

When planning apparatus, the first point in hygiene to be borne in mind should be to reduce contamination through dust by using the cleanest possible radiation. This means that heating surfaces should be in plain view, and accessible all around by hand, so that they will be kept clean, not by special effort, but as a matter of course in the ordinary routine of a household. Dust on concealed radiation, even if made accessible, is not seen, and, therefore, is invariably forgotten and neglected.

These facts should be sufficient, quite aside from engineering and economic reasons, to condemn all radiator screens designed for purposes of meaningless decoration. They are not the true solution of the problem and really turn direct radiation into a hot-air system without air supply. Screening is a sham, and should be vigorously opposed, not mildly tolerated. We should rather encourage neat, substantial appearance, inconspicuous finish and simplicity in arrangement of radiation. Unsightly bulk can often be reduced by judicious disposition and selection of the most advantageous style, or by deliberate reduction of the heat requirement, such as using double glass.

When direct radiation is indicated, it is possible, even in highly ornamental and formal rooms, to satisfy the artistic sense of architects without resorting to concealment. It is mainly a matter of judgment as to style and neatness in disposition, also of having the courage of one's conviction in arguing with the client. Of course, the public must yet be educated on the sanitary points, and the engineer on the ways and means to meet the situation. The present disinclination to expose radiators is mainly due to the shabby, clumsy and tasteless treatment that now prevails.

Radiating surfaces placed overhead or tight against walls are also objectionable. They are never dusted, except by an occasional air current, and then with a decided effect on the air. Fussy, round-about pipe connections behind radiators, creating dirt corners never cleaned out, are too often seen even in the better class of buildings. They always contribute to stuffiness, as do many styles of heating surface which are designed too much with a view to saving space and give too little chance for keeping them clean.

As will be pointed out later, indirect heat should be used only with certain restrictions. The casings enclosing the stacks should never be soldered up, or provided with a hand hole only. At least one full side should be hinged or made removable to invite occasional inspection and cleaning. Air filters should be used in cities to keep out the dust as much as possible. In general, dust pockets and dirt corners must be avoided. They are objectionable anywhere, as a latent menace to health, but become at once an active agent for mischief in connection with heat, which brings out the lurking germs and distributes them where they are most likely to do harm.

Temperatures of Heating Surfaces Should Be Lowered.

The second point of importance is the lowering of the temperature of heating surfaces, both with a view to preventing dry distillation, and for reducing the intensity of air currents. Hot-water heating gives the simplest and most effective means to this end. With the piping calculated and balanced accurately to secure even circulation at any flow temperature, it gives practically a full range of general control and makes it possible to carry heat strictly to suit the weather.

This means that for the greater portion of the heating season the temperature of heating surfaces need not reach the point at which decomposition is beginning to be felt. In hospitals, schools, and in other cases the surfaces might be increased within reasonable cost to keep the highest flow temperatures down to 160 deg. or 170 deg. so that a slight formation of gas could only occur under extreme conditions.

With hot-water heat applied by clean, well distributed radiation it is, therefore, quite feasible to eliminate practically all vitiation of room air through dust.

This is the reason for the popular feeling that this form of heat does not dry the air as much as steam. With the latter it becomes all the more important to insist on the cleanest form of surfaces, and to reduce the working pressure or temperature as much as possible. At best, steam heat will always be less desirable from the hygienic point of view. Hot-air furnaces, to be tolerable at all, should be installed of very ample sizes, giving the desired heating effect without excessively hot surfaces.

When heating by warm air, whether furnace or indirect stacks, the registers should always be in vertical position, never horizontal. Floor registers, especially, are dirt catchers in the most aggravating form, throwing up the dried dust and microbes straight into one's nose.

Overheating.

According to Fluegge, the proper attention to room temperature is hardly second in importance to the benefits of ventilation as generally accepted. He has demonstrated, that overheating is just as injurious, if not more so, than the effect of ordinary foulness of air due to lack of renewal. He explains this through heat congestion, caused by decreased emission from the human body, with a consequent disturbance of certain functions. It may be held at first thought, that summer heat would be equally, if not more injurious, but the conditions are distinctly different. Lighter clothing and freer air circulation usually allow of much greater heat emission by evaporation, except in the hottest and sultriest weather, which is known to be a tax on vitality even for short periods. In crowded, overheated, though ventilated rooms, with the occupants close together, keeping each other warm by their own radiation, and wearing heavier clothing, the heat emission from the human body is very much reduced.

It is naturally difficult to determine the relative bearing of foulness and of overheating, each depending so much on the degree and also on humidity, but the fact remains that overheating has been shown to be injurious in itself and is apt to be more so when combined with foul air, humidity and with pollution through unsanitary heating apparatus. Equable, moderate temperature is, therefore, one of the primary hygienic requirements.

The logical way of meeting it is effective heat control, not only to suit the weather, but to take care of the heat from occupancy. With steam heat, which does not lend itself readily to central regulation, automatic devices for individual rooms are necessary in rooms occupied by a number of persons who are not expected to pay attention to the heating service. In other cases some form of graduated hand control of local radiation may be sufficient. Sometimes fair service can be obtained by the use of long distance devices, facilitating better control of a plant by the engineer from a central point. With hot-water heating, automatic regulation is desirable, mainly in rooms that will be crowded on occasion. On the whole, it is easiest with that system to maintain equable conditions. Still better results could be obtained by using gas for fuel in house-heating boilers, as is done for bath heaters. The additional operating expense is no longer prohibitive in view of the saving in labor and other advan-

tages. This combination of gas with hot-water heat should be the ideal domestic plant of the future. In this connection it is well to remember that the best heat regulation is often set at naught by some extraneous heat source, such as a hot flue, or a warm floor. All such cases should be looked out for in planning and taken care of.

Cool Air is More Wholesome to Breathe.

Aside from the desirability of avoiding excess of heat, there is still another lesson in Fluegge's findings. It is well known that a considerable portion of the heat emitted by a human body is contained in the exhaled air. Cooler air inhaled means increased emission owing to additional heat necessary to raise it to the temperature of the body. If the air is cool and sweet besides, it will be inhaled more freely and stimulate functions. Hot and dusty air makes more labor in breathing, gives less oxygen, if only for the same volume, and keeps circulation below the normal. It follows that the lowest air temperature compatible with comfort is the most rational. We all know that the indoor temperature at which one may feel comfortable varies considerably, according to the temper of the occupants, with the relative humidity and other conditions. But our sense of comfort is probably affected quite as much by the temperature of the surrounding objects, as they radiate heat or absorb it from the body. Thus we need less clothing on a sunny day than in cloudy weather, with equal air temperatures. This is so, because radiant heat will pass through the air and to its destination, without appreciably raising its temperature. Incidentally, it will be understood, that air is not spoilt by the heat rays, but by convection, or contact alone. For these reasons a room is apt to be most comfortable if the bulk of its walls is thoroughly warmed by continuous heating service, but the air be kept relatively cool by occasional opening of windows or by a constant inflow of sweet, uncontaminated air not heated beyond room temperature. This idea of warming the walls, or the structure, rather than the air within, is conducive to equable conditions, and reduces the tendency to overheating, by the heat sources, as well as by the air supply, as each can be regulated effectively, and will not interfere with the other. Warmer room air, on the other hand, produces a lower percentage of relative humidity, and naturally tends more to excessive dryness and dust pollution by heating.

For the same reasons it appears to be more advantageous to utilize the radiant heat of direct surfaces, rather than the heat emitted by convection. This would favor the selection of low, widely spaced, flat radiation, which is generally also more sanitary.

Cool Air and Radiant Heat vs. Hot Air.

The theory of warm walls and cool air also points towards the ideal for the solution of all heating and ventilating problems, that is, to reproduce for indoor life those atmospheric conditions which we know to be most pleasant and wholesome. A direct system with continuous service, with moderately warm, well distributed, clean surfaces giving more heat by a mild radiation than by convection, combined with a tempered air supply in some sanitary form, will certainly be the nearest approach to the mild radiant heat of the sun and cool bracing air. Any apparatus using fresh air as a heat carrier will produce the opposite effect, resembling more the enervating sirocco, or warm, cloudy weather. In any event, such apparatus necessarily gives warmer air and cooler walls since it is the air that must heat the walls. Besides, the higher the incoming air must be heated, the more it will lose of its natural sweetness. Hot air heating also tends to produce strata of warmer air overhead and cooler air near the floor, a condition which is undesirable from the hygienic as well as the economical point of view. Again, the problem of controlling the heat without either disturbing the air supply or causing other discomforts is decidedly more complex.

There are instances, of course, where heating by air may be indicated, or permissible. The indirect method, however, should be resorted to only in such cases where the heat requirement is relatively small, so that the air supply need not be warmed to an undesirable degree which will spoil it for purposes of ventilation. The same amount of heat may, of course, be obtained with smaller volumes at higher temperature as with large volumes at lower temperatures, but the best authorities agree that it should not be brought in to a room at more than 110 deg. F. Rietschel puts it at 104 deg. This is a severe limitation for conditions maintaining here. About 120 deg. F. would seem justified. In cases where it would still result in excessive volumes it is nearly always advisable and proper to reduce the heat requirement by extra protection.

The indirect system is often installed with the idea of securing better ventilation than is expected by direct heat alone. As a matter of fact, the air renewal in either case depends largely on the natural outward leakage afforded by the structure and the draught power of any vent flues available. The inward leakage in one case comes through the register, in the other case through walls and windows. The latter air is apt to be sweeter and purer than that from the stacks. Moreover, the window ventilation can be increased without stopping the heat supply from radiators while the draught in a hot-air flue is liable to be reversed under wind action when heat is most needed. The idea of better ventilation through hot air heating is, therefore, nearly always a delusion.

On the whole, the use of the indirect method should be discouraged, especially where a constant air supply of given volume is not essential. In cases where direct radiation is absolutely objected to, there are other means of meeting the situation, for those who have command of the subject. Unfortunately, it would lead beyond the scope of this article to go into the various possibilities.

Direct-indirect heating, with the air inlets back of radiators, is also adversely affected by wind and weather, giving less air when most is needed. Proper control of temperature becomes almost impossible without shutting the inlets, which is the usual fate of these devices. A more satisfactory solution in some cases may be found in the use of very small sash ventilators, admitting fresh air directly, in as many places as possible, deflecting and diffusing it, and thus keeping the room air sweeter and cooler, with comfort depending on the radiant heat provided.

In general, radiant heat is best applied by hot-water radiation, which has an average temperature of only 130 deg. to 140 deg. and is rarely unpleasant. With steam-heaters, the radiation is usually too intense and too concentrated, and should be modified by greater division of surface.

Hygiene in Ventilating.

One cannot discuss hygiene in heating without touching on the same principles as applied to modern ventilating apparatus. Even though each should act independently, one may spoil the result of the other, hence they must be treated in harmony. The first point to be borne in mind when designing ventilating apparatus, more especially an air-supply system, is again salubrity. This must not only be made possible, or probable, but compulsory or automatic, inasmuch as the air passages are necessarily

out of sight and therefore only too apt to be neglected. In order to prevent dead spaces, which form eddies in the current and create dust pockets, smooth clean metal or tile ducts should lead directly from outdoors to the tempering surfaces and fans, and from the same to the flues and registers. All passages should be of sizes to assure a fair velocity of the air current that will not allow any accumulation of dust and foreign matter at any point, from intake to room. Tempering surfaces should also be spaced for a fair speed, and should be of the kind that will present a smooth surface, completely swept by the air current. The entire system in fact should be designed with the idea of sweeping itself, or making it "clean as a whistle." This is recommended not only with the idea of avoiding all possible contamination but also in order to preserve the natural sweetness of the air, which is always destroyed in contact with organic dust stirred up by the unavoidable motion. Moderate temperature of the stacks for warming, higher speed in passing the surfaces, and lowest practicable temperature of the air supply will always tend to preserve its ozone and oxygen, that is, its life and wholesomeness.

These leading ideas should be carried out just the same, if the air is filtered, washed, humidified and ozonized. Cleanliness cannot hurt the treatment, but will often help it. In fact, all means should first be exhausted to secure fair results by salubrity. Artificial "air conditioning," as it is called, should be reserved for meeting severe conditions or unusual requirements, that is, when it is desired to improve upon the outer air for special reasons. This refers especially to moistening, which is rarely needed, if the air supply is pure and cool.

Ozone should not be regarded as a substitute for ventilation, as it does not supply all the elements required. It should be used only to help in relieving extreme, intense vitiation that would call for excessive air volumes.

Preventive medicine should be used in ventilating work, not only in applying hygiene, since poor engineering may offset the effort at sanitation. It is only necessary to point out that there are frequent chances for pollution of room air from outside sources not under control, which may spoil the results, unless taken care of. Lack of provision, for instance, for effective removal of odors from kitchens, toilets, wardrobes, in other parts of the same building, almost inevitably makes itself felt. It would lead too far to go into all these probabilities, but in general it is necessary to realize that highest efficiency depends on good engineering as well as on proper attention to sanitation.

Capacity is Not the Only Requirement.

The mere capacity of an apparatus to heat, and to effect a certain renewal of air, should no longer be the only criterion of performance. The sanitary requirements must receive equal consideration, if the best results are to be obtained. It will be conceded that the average practice in the planning and installation of apparatus is still deficient in these respects. Indeed, probably the best chances for improvement in this field at the present time may be found in the application of hygiene. In any event, due attention to this subject is more likely than anything else to prevent such extremes as the establishment of open-air schools. It will also tend to overcome the frequent opposition to modern ways of heating and to artificial ventilation on the part of the medical profession, which has no doubt its basis of justification. As a general conclusion it may be stated that the preventive sanitary measures advocated can only increase the efficiency and usefulness of modern installations.

PACIFIC COAST COMMENTS.

San Francisco.

San Francisco is experiencing one of the liveliest times this week that has been the case since the days before the fire, when great conventions were held here in numbers. The Typographical Union has just completed a meeting that has brought thousands here and now the national convention of the Fraternal Order of Eagles is being held here, and it is estimated that there are fully 100,000 strangers in the city. Among the delegates to the latter convention are many interested in the plumbing trade, and local firms are being visited by several of these. In addition to the conventions, one of the leading railroads has put on a round trip rate of $10 from Los Angeles' and this is attracting thousands from the southern part of the state. Many of the inhabitants of the southern city had not seen the new San Francisco and the excursion was put on to enable them to come here and get a glimpse of the immense work that has been done in the past four years; and to inspect the site that has been selected for the Panama-Pacific International Exposition, in which the entire coast is so vitally interested. A number of plumbers took the opportunity to make this trip to see the fine new buildings that have been erected here and to escape the heat-wave that has been experienced of late in the southern part of the state.

The many strangers who have been here of late have brought the need of greater hotel accommodations to the attention of builders, and there is now more building work of this character under way than has ever been the case before. Most of the structures of this character now in course of erection are small ones of from 100 to 400 rooms, but work will be commenced at an early date on several large hotels. The suburban cities are planning to house many of the visitors to the great exposition and several large hotels are in course of construction across the bay. At Oakland the finishing touches are now being placed on the Bankers' Hotel and the announcement is made that work is soon to be re-commenced on the Claremont Hotel in classic Berkeley. This latter structure is to be one of the finest on the coast and $1,000,000 has already been expended on the building. Additions are to be made shortly to the Shattuck Hotel in Berkeley and the plumbers of the College City are already getting ready to bid on the plumibng work.

The unofficial announcement is made that the Southern Pacific Railroad Co. will shortly commence work on the construction of a monster passenger depot at the foot of Market street near the Ferry Building. For several years this transportation company has been busy securing property in this locality and now has sufficient property under its control to extend its tracks from the present inadequate depot at Third and Townsend streets to Market and Spear streets. This road is now erecting a large depot at Sixteenth street, Oakland, to care for overland and suburban traffic, the new building to contain the very latest heating, ventilating and sanitary systems, features that were almost entirely lacking in the building recently removed.

The Board of Public Works of San Francisco has authorized the clerk to invite proposals for furnishing the equipment of the new hospital power-house, the bids to be opened on September 2d. The estimated cost of the power-house work is $70,000, including steam, gas and water-piping for the tunnel, to cost about $20,000. Other work that will soon be let is the installation of a laundry-plant, a refrigeration-plant and a sterilizing-plant. The latter will cost about $5,000, and the other plants about $15,000 each.

Elsewhere in the State.

San Leandro, Cal.—Health Inspector Geisenhofer has made an examination of the town hall, and has declared it to be insanitary. His report touches on the plumbing especially, which he asserts is antiquated. The report will be acted upon at an early date and a new building will probably be erected.

Tulare, Cal.—G. A. Baker, a representative of the State Board of Health, recently inspected the sewer system just completed at Tulare. This was found to be satisfactory and has been accepted. City Plumbing Inspector Bradley states that 93 permits have already been issued for connecting residences with the sewer and a large amount of plumbing work will probably be done in that thriving city in the near future. This is one of the most rapidly growing of any of the California cities, due largely to the great development of the surrounding territory.

QUESTIONS AND ANSWERS

WHY ARE SINK-STRAINERS NOT REMOVABLE?

Editor "Domestic Engineering":—One of my customers asked me the other day why sink-strainers are always fastened, and not to be easily removed. I have never heard a reason for this. Will you be kind enough to give one? "Strainer."

If the lady of the house did her own work, and was posted as to what the drain from the sink would carry without clogging, a removable strainer might safely be used. These conditions are not often met and the carelessness of the average "kitchen mechanic" would render such a strainer most unpractical. The plumber would be kept on the run removing the stoppages in the sink-pipes much oftener than he is now called. As it is, the strainer keeps out most of the refuse that would clog the pipe in a few days if it reached it, and no one can tilt up the strainer and allow the various odds and ends to disappear. The average servant is long on saving time, but mighty short on common-sense, so the present form of strainer will probably remain for some time to come.

HANGING THE INDIRECT RADIATOR.

Editor "Domestic Engineering":—Is the indirect radiator hung exactly level? If not how much slant, or fall, it is desirable to give such a radiator? It is better to use wood, or sheet-metal for the air-pipe that supplies the air to the indirect?

Boston, Mass. Sam Archer.

We should advise setting the indirect radiator with the return end about half an inch lower, so that the condensation will flow in that direction. Use the level and be sure of the amount of fall that you have. The air-ducts are better made of galvanized-iron than of wood, which generally shrinks and leaves cracks through which the cellar air passes to the rooms, carrying with it a goodly supply of dust and dirt. The metal ducts are not much more expensive, if you count the time of the workman as anything. Many heating contractors expect the fitter to construct the air-duct. This is a mistake, for the fitter is not a carpenter, nor has he the proper tools with which to do a carpenter's work. If the cellar is damp, the air-duct may be painted in order to prevent rusting. All things considered, we favor the metal air-duct, because it is easier to install and cleaner.

BOWL KEEPS DROPPING OFF.

Editor "Domestic Engineering":—At a certain house where I am often called upon to make repairs they have a marble lavatory and it seems almost impossible to fasten the bowl to the slab of marble and make a permanent job of it. Can you suggest anything that would aid in the matter? L.

If the bowl keeps slipping it is evident that you have not a very good style of clamps, or else do not do the job properly. In the first place, it is much better to use four clamps than to attempt to make the bowl stick by the aid of three clamps, as is very frequently done. Often the clamps are not half put on and will give way, thus throwing all the strain on the plaster of paris joint, which soon yields.

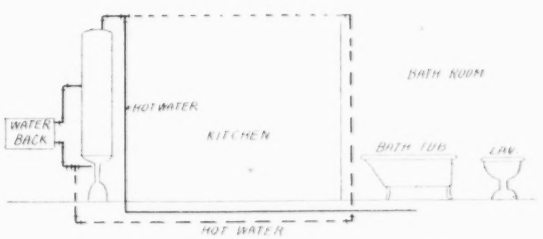
The best suggestion that we can give you, and one that will forever put at an end your difficulty, is to sell the customer one of the latest improved style of lavatories. Take a catalog in your pocket and go up to that house, or bring the customer to the shop and show him or her one of the lavatories in action. This will give you a chance to experiment in salesmanship, which you do not appear to have tried. Enter the arena, Mr. L., and who knows what you may accomplish?

RANGE-BOILER PIPED FOR CIRCULATION AND HOT-WATER SUPPLY.

Editor "Domestic Engineering":—We enclose diagram of a range-boiler as it is now connected. The fixtures are over 22 ft. from the boiler, and it takes a long time to get hot water at the fixtures. We were going to pipe this so as to get a circulation of hot water in the hot-water pipe by connecting it to both ends of the boiler, but we are afraid when drawing water from the circulating-pipe the water might flow from the cold-water end of the circulating-pipe instead of from the hot-water end. Please advise us how we can do this correctly.

Seneca. G. B.

In the original sketch which we have redrawn and combined, the flow-pipe from the water-back enters the flow-pipe to the fixtures at the top of the boiler. This we have changed, making the flow-pipe from the water-back enter



How to Get Hot Water Quick on this Range Boiler Job.

the side of the boiler, as in the majority of such jobs. In this sketch it is intended to show the circulating-pipe by the dotted lines which leave the top of the range-boiler, pass along the ceiling, drop through the floor and enter the cold-water pipe from the water-back. Another illustration of the circulating method is given on page 211 in our August 26th issue, which shows a somewhat different method of running this circulating-pipe, but the results would be the same. In this sketch, running the circulating-pipe after the method just described, the course of the original hot-water pipe, shown by the heavy black line leaving the range-boiler and dropping to the floor, of course, would be omitted.

AMOUNT OF ASBESTOS ON BOILER.

Editor "Domestic Engineering":—I have observed, in some number of your paper, that you say to figure about 6 lb. per sq. ft. in estimating the amount of asbestos

required to cover the boiler. If one figures this amount, how thick will the covering then be?

Marion. A. J. Parsons.

If the covering is put on with proper care and with due regard to uniformity, it should be about 1¼ in. thick.

THE DISPOSAL OF GARBAGE.

Editor "Domestic Engineering":—Is there no better manner of disposing of the garbage of a town than by having men go around with a wagon hauling the stuff from pillar to post to the disgust of the passers-by, causing an abominable stench wherever the wagon goes?

James Bennet.

It seems to us there is. What about using some of the garbage-burners which have been advertised at various times in this paper? Let the collectors gather the ashes only, which can be used for fertilizing purposes. Perhaps, some day, we may have pneumatic tubes connected to each sink, the tubes ending in a central plant where the garbage can be suitably disposed of. This would be costly, but not impossible.

HOW MUCH H. P. WILL THIS JOB REQUIRE?

Editor "Domestic Engineering":—We have on one of our jobs a 130-gal. steel boiler and a drive well 28 ft. deep. Would like to know how much h. p. it will require to lift the water from that depth and put a 60-lb. pressure in tank.

Louisiana, Mo. C. B.

We have lifted water 28 ft. and put a pressure of 50 lb. on a tank with a double-action hand force-pump. Should judge that a one h. p. would be ample for the purpose.

THE SIZE OF A GAS BILL.

Editor "Domestic Engineering":—Speaking in general terms, about how much should the gas bill run for a six or seven room flat, the gas being sold at 80 cents per thousand feet? If it ran over $5 per month, would you think that there was something wrong?

Athens. J. C. James.
Athens.

First we would want to see the bill. "Maid of Athens, ere we part, where's the bill that made you start?" Then we'd ask the wife how many card-parties she had held that month. If she said "not guilty," we would tell Mary to bring the young man to popping-point. If she cleared herself, and the bloodhounds could not discover a leak, we would have the meter tested. One should know anyhow, the number of lights, time in use, amount used by laundry and range-boiler.

Speaking in general terms and from some of the gas bills that we have had a chance to examine, we should say that you had better call for a test of the meter. The bills we saw ran from $1.40 up to some $3 per month in the size flat that you describe, depending, as we have explained, on the number of tips and fixtures used and the time that they were in use. Have the meter tested by all means if you are in doubt.

HOW TO READ THE TEES.

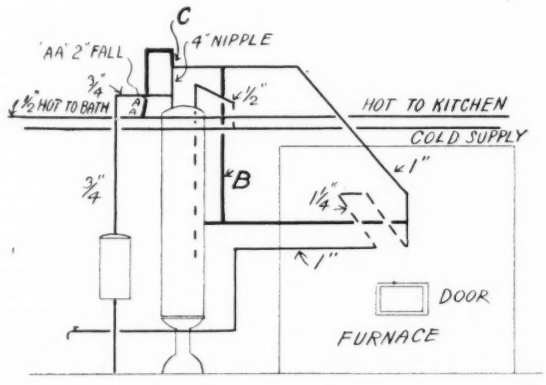
Editor "Domestic Engineering":—Will you tell me through the paper how to read the ells and tees so that I can have an idea of how they are called?

"Tees."

The reading of the ells is not a difficult matter. If you have an ell that has threads at each opening that are of the same size of thread, and both of the openings are of the same size, it would be called whatever size of ell that the size of the pipe that it fitted was. One-inch pipe, 1-in. ell; 1¼-in. pipe, 1¼-in. ell, and so on. If one of the openings is smaller than the other it might be 1½-in. ell; or any other size that the smaller opening happened to be. The tees are read after what is called "on the run." Suppose that you have a steam main that is 2 in. in diameter and at a certain point it reduces to 1½-in. and at that same point takes off a branch that is 1 in. in diameter. The reading of that particular tee would be as follows: 2 x 1½ x 1. If, however, it was desired to turn the corner with the 2-in. main and at the same time take off a branch that was 1 in. the reading would be as follows: 2 x 2 x 1, although some, we believe, would prefer to read it 2 x 1 x 2.

ANOTHER ANSWER TO A RECENT PROBLEM.

Editor "Domestic Engineering":—In your issue of July 15th, in "Questions and Answers," I find sketch from A. G. Renn, of St. Louis, Mo., and note your answer, which I do not agree with. You state, add more coil. Now, I have used a coil not more than 22 in. long of 1-inch pipe on a 40-gal. range-boiler in a job of this kind and had the water boil, so do not think that is the trouble, I would



As M. H. Would Pipe the Job.

suggest, have all pipe leading from range-boiler and return 1-in; it gives a faster circulation and more volume. Also connect inside of boiler if possible, with a pipe leading up as I have marked in sketch and numbered B. What I think is principally wrong with this job is pipe AA which should be taken off at place I have marked C, Raise this about 4 in. and then drop to tee in hot water pipe, and job will give good service. Also see that there are no other traps in circulating system. Coil in furnace may have to be cleaned if it has been in use for any length of time, because there is nothing that will clog a coil as quickly as a trap in circulation pipe. I do not think if the writer ever had, as he states, a job installed like the one above, that is, with a trap in it as large as this one, he ever got much hot water out. M. H.

The Boss Talks to His New Foreman About Heating

By T. Twice.

II.

Well, that layout looks all right. You figured the rooms to 70 deg. inside when zero outside I presume. The first thing we do will be to see how you have placed the radiation so as to get a uniform heat throughout the entire house. We will make the radiator in the living room 56 sq. ft. instead of 48 sq. ft., and 28 sq. ft. in the den instead of 24 sq. ft. You will see that both of these rooms open into the hall, and there will be a tendency on the part of the warm air to rise to the second floor, which would leave these rooms cooler than you would desire, unless we offset this fact by increasing the radiation in them. I see you have already added for the fire place.

The radiation in the den may look strong, compared with the living room, but the den, being on the north side of the house, calls for additional radiation, and you will find the house will come pretty close to being heated uniform throughout with the radiation as you now show it.

The kitchen looks a trifle light, but the fact that they will use a coal-range there, and then it being located directly over the boiler, meaning a warm floor, will keep this room all right. The floor being warm will more than offset any additional radiation that might be required by the heat-loss from the ceiling, due to the sleeping porch not being inclosed.

Here is a point you want to keep in mind, and be careful about this as it is very easily overlooked, and that is to look out for rooms that have ceilings exposed like the kitchen, and also for rooms like the dining-room, or rooms on second floors that have the floor extending out over bay windows or porches, and having the floors exposed to the weather.

These places are fine for the wind to get in, and are usually finished by the carpenters with due regard to appearances from below, but nothing thought of making it as tight as the siding of the building. You will save yourself some annoyance and expense if you will bear this in mind.

Figs. 2 and 3 will give your mechanics something to go by, in locating the radiators, and will save a lot of useless time, and also annoyance to the lady of the house, as she told you where she would like them placed, and that should be enough, and it will also help to push the job along.

By the way, I forgot to tell you that Mr. Jones is going to put in a separate flue for the kitchen-range, as I impressed him with the fact that he would get better results with his heating system by giving it a separate flue.

Some people do not realize the importance of a good draft for the boiler, and seem to think they should be able to connect any amount of stoves to the boiler flue, without it affecting the proper operation of the boiler draft.

Always insist on a separate flue for your boiler, John, and remember it is an easy matter to check a good draft, but a horse of another color to improve a poor one.

That grate in the living room is a mighty cheerful looking article on a cold winter night, with a good coal fire in it, John, but getting warm from it, nothing doing. Roast on one side and freeze on the other, turn over and repeat.

You can make a continuous performance of this turning over if you have the patience, but you can take it from me, I would not part with the two grates I have at home for anything. Finest kind of ventilators, and keep the air constantly changing in the rooms. If you want to see the action of the air currents in a room that has a grate, just sit down some evening and keep puffing at your fifty center (?), and watch the smoke travel. That is where the grates shine, in the keeping of the air in the rooms changing.

But to get back to Fig. 1. You make one continuous circuit around the basement. This is not a very long main, and that arrangement looks all right. You have the right idea in the way you start your piping from the boiler. Let's see, you start up full size of the boiler-tapping and carry to rear of boiler and drip into the return tapping on the boiler. Then you take your main out of the header between the last riser from the boiler and where you drip into the return-opening in boiler. You

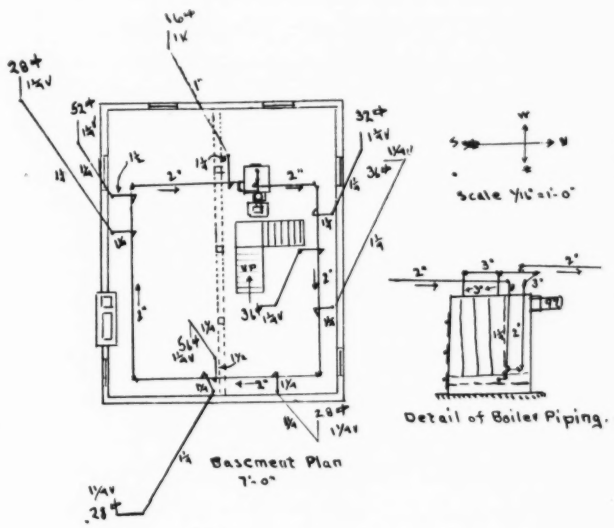


Fig. 1

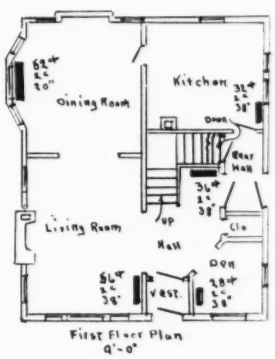


Fig. 2.

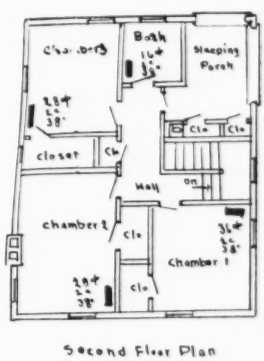


Fig 3

always want to make your header as high as you can and then start away with your main or mains with a close nipple and ell. Running the risers full size of the boiler-tappings will have a tendency to keep the water in the boiler from being carried up into the header along with the steam, and if it should carry up, the drip will carry it back past the opening for your main and you will have steam free, or reasonably so, from water, freer than would be possible, perhaps, if you took one riser only from the boiler, and started your main directly from the top of this riser.

With a header, you will also find that you will get a steadier water-line in your boiler. I have seen some boilers that were certainly bad actors in the matter of lifting or throwing water into the mains, and it looked for awhile as though an injunction was the only remedy, but the header installed as you have shown it, stopped this performance. You reduce the velocity of the steam-travel by this method, and that eliminates nearly all of this trouble.

Try and keep your main where it drops into the return-opening of the boiler at least 18 in. above the water-line, if possible. You might have to pit your boiler some time to do this, or else increase your pipe-sizes. You can run pretty close to the water-line if you proportion your piping, and I have put in some jobs with the return only 4 in. above the boiler water-line, but you are inviting trouble, John, when you get this close. I had to increase pipe-sizes to overcome the loss in pressure, due to friction, and sometimes termed pressure drop or differential. A column of water 26 in. high means a pound pressure, and that is just the height the water will back up in your return main, if you have a pound pressure loss in the piping from where you leave the boiler until you connect your return to the boiler. You can very easily see why this should occur. Nearly all low-pressure systems are designed to have **only about one-ounce pressure drop.**

Place a good (did you notice I said good?) automatic air-valve on the return-end of your main, as shown in Fig. 5. Some engineers contend that an air-valve at this point is uncalled for, but there is no argument on this point for me, John, as I always put an air-valve at this point. It relieves the main of air at this point, without waiting for the air to work out through some of the air-valves on the radiators. If you do not put a valve at this point, take it from me, you are going to have slow circulation of steam. I don't see any reason why this job won't work fine.

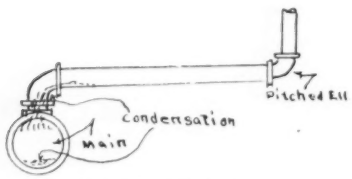
Here is what I have used for valve-sizes for one-pipe steam work for a number of years, with good results:

Up to 24 sq. ft., 1-in. valve; 24 to 50 sq. ft., 1¼-in. valve; 50 to 90 sq. ft., 1½-in. valve; 90 to 150 sq. ft., 2-in. valve. I don't think you will be very far off if you stick to these sizes.

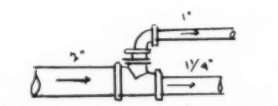
As a general thing, it will be good policy to increase your horizontal branches one size larger than your risers from them, but close to the boiler, or when the radiation is not strong for the size valve you have on it, this will not be actually necessary.

Here is one thing to bear in mind, and see that your men do it, **ream your pipe-ends.** I have the actual loss in pipe-sizes by not reaming the ends figured out and it is around my desk somewhere. I will look it up and give it to you to-morrow night. You will be a little bit surprised, I fancy.

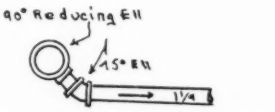
Fig. 6 is not a good method of taking your branches from the main, as you will notice the condensation sprays through the steam as it drops back into the main and not only kills the steam for this branch, but also for branches beyond it. This is a poor branch and should be avoided,



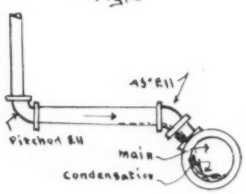
Detail of Branches.
Poor method.
Fig. 6



Good method of Reducing Mains
Fig. 9

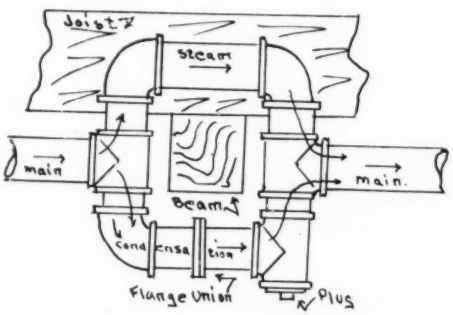


Method of Reducing Main
Fig. 11

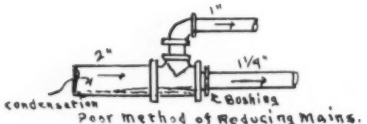


Detail of Branches.
Best Method.
Fig. 7

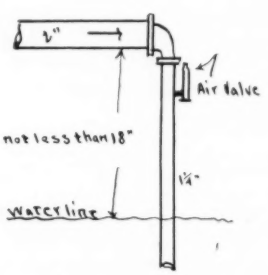
Good method of Reducing Mains
Fig. 10



Piping around Beam
Fig. 12



Poor method of Reducing Mains.
Fig. 8



Reducing the Main at Boiler
Fig. 5

unless actually required. Fig. 7 shows good connection, as the condensation can flow along the bottom of the branch, and the bottom of the 45-ell and down the side of the main to the bottom, and does not spray the steam in the upper part of the main. This gives you better steam for this branch and also for the branches beyond, and will not increase your pressure-drop, as Fig. 6 will do, and will allow you to work on a lower water-line at the boiler. Fig. 8 shows the condensation pocketed in the main where it was reduced with a common fitting and bushing. This is a fine place for the "anvil chorus" to get in its work.. Fig. 9 shows an eccentric reducing-tee. You will see this keeps the bottom of the pipe on a level and permits the condensation to flow freely back to the boiler or other point. Fig. 10 shows an eccentric reducing coupling for the same purpose, and with the same results. These eccentric couplings are also made with the large end threaded male and the reduction threaded female, and this enables you to make ordinary fittings eccentric if you wish. Fig. 11 shows a good way of reducing your main at corners, or wherever necessary, using reducing-ell, 45-ell, and close nipple. This is cheaper than the eccentric fittings, and where you have room to use it, is just as good. Fig. 12 shows a good method of getting the piping around a beam, or the same thing would apply to your main if you had to pass a side door, and could not very easily change your piping scheme. The steam will pass up over the beam as the arrows indicate, and the water of condensation will drop below the beam or below the floor if necessary, and rise up into the main, and continue on its way, just as freely as though it were a straight pipe. This might help you out some time in a pinch, and you need not be afraid to use it. Always put a plug at the bottom, so you will be able to clean the piping at this point, or drain it if required.

I guess that will give you enough to think over for tonight, so let's close up and make for the feathers.

(To be continued.)

RIGHT OF RECOVERY FOR COMPLETION OF HEATING PLANT.

In a suit against a husband and wife to recover a balance claimed to be due for furnishing and installing a heating plant, the wife admitted the construction of the heating plant in her dwelling, but alleged a contract price therefor of $508, and, further, that the plaintiff was also under contract to do the plumbing of the house for $425; that the plaintiff only partially performed each contract, but had done and furnished extra work and materials of the value of $20.95, and had been paid $500. The answer then set out the omissions claimed, and, finally, alleged damages, by reason of those omissions and faulty work, in excess of any balance due upon the contracts.

Upon the trial it appeared that the wife had given a contract to another party for the installation of the heating plant, which contractor defaulted, and the plaintiff, who had the contract for the plumbing of the house, was asked to complete the heating plant, and it was claimed that he assumed the contract, including the price, $508, while he insisted that he only agreed to install the plant, thus completing the contract, but without any agreement as to the price, and upon the trial elected to recover the reasonable value.

The trial court found that there was no agreement as to the price, and that the reasonable value of the labor and material was $700, for the installation of the heating plant, and a judgment was ordered for $630.25 as the balance due for the heating plant. No cause of action was found against the husband.

In affirming the judgment of the lower court, the supreme court of Minnesota says, Chas. Wilkins & Co. vs. Sublette, 126 Northwestern Reporter, 1089, that there was no doubt the evidence sustained the finding that no price was agreed upon between the parties for the completion of the heating-plant contract, but the supreme court thinks that the evidence, fairly construed, showed that the plaintiff undertook to furnish the labor and material specified in that contract and was required substantially to perform the same. The defendant was, therefore, at liberty to show a failure by the plaintiff substantially to perform, if she could, but the trial court's decision, etc., amounted to a finding that the heating contract had been substantially performed by the plaintiff

Nor does the supreme court think that it was error, after the plaintiff had testified to the value of the work and materials, to permit him to introduce in evidence his daybook, in which the account was kept under the husband's name. It says that while it finally appeared that the wife was the only person indebted, her husband took more or less part in the direction of the work, and, while the court found he was in no way liable, the fact that his name, instead of his wife's, headed this account, was immaterial. And even if there was not a sufficient foundation for the introduction of the plaintiff's books of account in evidence, their admission did not constitute reversible error as there was other competent evidence sufficient to sustain the finding.

ANNUAL REPORT OF THE DEPARTMENT OF PLUMBING, WASHINGTON, D. C.

The Commissioners of the District of Columbia have received from A. R. McGonegal, inspector of plumbing, the 29th annual report of his department for the fiscal year ending June 30, 1911. It details the great amount of work handled by the field and clerical force, showing a decided increase in the work of all branches of the department and the capable manner in which it has been handled by the small force. It required nearly 100 days extra time (combined time of all) in order to keep the work up-to-date. The public-comfort stations (three in number) proved more popular than ever during the past year, according to the report, which showed that over 2,000,000 people visited them, the receipts amounting to a little over $2,200. A charge of five cents is made in these stations for a private compartment, and two cents charged for the use of clean towel and soap in the public room. A number of entire new systems of plumbing were installed in the schools of the District during the year, in addition to numerous minor changes and installations of drinking-fountains, urinals, etc., which nearly used up an appropriation of $40,000. Bubble fountains, made from designs of the local plumbing office, were used exclusively.

In his recommendations for the fiscal year beginning July 1, 1912, Mr. McGonegal urges the establishment of two other permanent public-comfort stations, and the erection of several smaller ones at bridges and in or about parks of the city. He also again recommends the establishment and maintenance of free public baths, and the compulsory education of children in the public schools in the art of swimming, which calls for the construction of pools in several school buildings.

A little Swedish boy went to school and the teacher asked his name. "Yonny Olson," he replied.

"How old are you?" asked the teacher.

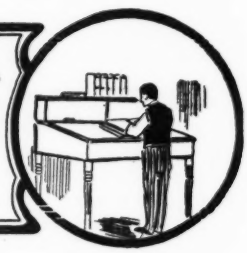
"Ay not know how old Ay bane."

"Well, when were you born?" continued the teacher.

"Ay not born at all; Ay got stepmutter."

BUSINESS MANAGEMENT

NEW METHODS FOR OLD



OVERHEAD EXPENSE.

Editor "Domestic Engineering":—Much has been said about overhead expense or so-called running expense and in almost every plumbers' association this question has come up: "How much does it cost you to do business?" And when in these association-meetings everything has been said, that could in any way enlighten the merchant plumber on this question, what has there been accomplished? What has there been done to improve conditions? I say, very little has been accomplished, for after a year's time it has always been the same old question.

Some plumbers think that this item of overhead expense is where the shoe pinches, but far be it from this, as you will notice by reading this letter, a little further. When you get down to the actual amount of business done, whether this amount be 15, 20 or 30 per cent on the amount of business done, or figuring it in any other way you choose, the fact still remains that you haven't learned how to make money, you have only heard what the other fellow is doing and it only gives you something to talk about. Now this does not apply to all the merchant plumbers but to the vast majority. It's simply talk, talk and then some more talk. Some of the wiser ones will however get next or will copy from others that have been successful, and right here I want to say that is where a lot of the boys make their mistake, these "copy fellows." What they should do, instead of copying, is to listen to everything that has been said, then go ahead and do something in a way of their own that will make the dollars. Catch the drift? I mean, be original. A master plumbers' association in one of the big western states was trying to educate the plumbers, and one of the things that it tried to get at was this:—How much should be charged in order to get a fair profit out of the business? It sent a list of questions to the members which, if answered properly, would help them to ascertain just what the running expense of the business was, and how much at least should be charged. One of the items was bookkeeper's wages; another was the amount of money that the proprietor drew out of the business; still other items were rent, heat, telephone, advertising and well, as a matter of fact, the list included most everything that one could think of and then some. Now here is the funny part, or rather the serious part; no, it is not the serious part, there should be no serious part in the business. One boss said that he drew $1,200 a year; paid $780 a year for his bookkeeper; paid a collector $73; paid store rent $480; hauling $720; telephone, heat and light $144; insurance and other expenses amounting to $96. This plumber did a business of $50,000 a year. Let's not forget he also spent $7 for charity. Now here we have it a total overhead expense of $3,500. The association expert figured that this man's running expense was 7 per cent. Never mind as to whether this was figured right or not, that is not what I am trying to show you. I am trying to show the difference in the item of overhead expense, as well as the difference in the amount of money that was made. Remember, at the end of the year this man's books showed a net profit of $750. I might also say that this man said that he did not have any bad accounts. Another plumber sent in his list something like this: Amount of business done, $40,200 less $200 for bad accounts; net business, $40,000. He drew $3,500 during the year; paid for rent of store $720, telephone, heat and light $200; book-keeper $1,200; incidental expenses, such as printing, car-fare, stationery, insurance, etc., $1,000; hauling $500; charity, etc., $100. Total overhead expense, well, there was another large item that I do not remember, which brought the total up to $8,000. This man's net gain for the year according to his books was $3,000.

This man's running expense, according to the association expert, was 20 per cent; that is, for every dollar that he charged, he paid out 20 cents for expense. Quite a few of the master plumbers laughed when they saw this statement, and said Blank must have been joking, and that his items were not right. Take it from me, boys, I happen to know Blank, and I can vouch for his statement being true. One man's expense was 7 per cent, as against the other fellow's 20 per cent. The man with the small expense did the bigger business, but made less money. The man with the bigger expense probably had a better class of trade; probably knew how to make out his bills so that there would be no kick; probably collected promptly and did not have to borrow money to conduct his business. He was no doubt a better manager than the first-mentioned fellow; he no doubt had better men than Mr. Low Expense.

Listen: It is not always the fellow with the little expense account that is making the most money. Then why this cry of cutting down overhead expense? I for one say: Boost it up, providing it pays. Some boss plumbers could not make a success of business if their running expense were only 2 per cent, and others could make it pay if their running expense were 30 per cent, and this in competition with the 2-per-cent fellow.

There are many ways of doing things, and—well, what's the use of trying to teach an old dog how to do new tricks? But here's one of them. A plain ½-in. Fuller faucet costs you as much as, that is, it does not cost you much more than, the eccentric, the stem and ball for a plain faucet. A customer comes in to Mr. Low Expense and wants his faucet fixed. Low Price puts in an eccentric, stem and ball, and works at the job about 10 or 15 minutes, but let's not say anything about the time. Cost to him is about 25 cents. He charges 50 cents, making 100 per cent profit. Now Mr. Blank, the fellow with the big expense, instead of fixing this faucet, sells a new one at $1, making 70 cents or 233 per cent profit. Do you catch on? This also applies to repairing of ball-cocks. One man will fix a ball-cock by grinding down the seat and putting on a new washer, say at a total cost for time and material of $1.05, and will make on the deal about 55 cents. Another plumber, we will say the big expense fellow, will do a better job for his customer and instead of fixing the ball cock he will put in a new one. Cost to plumber, $1.75. At the regular charge for work and material, he makes about $1.63. The first man made about 50 per cent, and the other about 90 per cent. These are a few of the

things that count but not all of them. There are a lot of others. Don't forget the buying end, the collecting end, and, in fact, don't forget any of the ends and don't even forget the middle.

Now, all together, the chorus goes something like this:

"Let us live while we may and damn the expense,
For we will all be mouldy a hundred years hence."

Minneapolis. North Du Pont.

QUALITY.

Some time ago I was looking over a mass of invoices just brought me by the mail-carrier, when I noted at the top of one of them the following sentence: "The Recollection of Quality Remains Long After the Price is Forgotten." This sentence is copyrighted by the Simmons Hardware Co., St. Louis, and originated in the fertile brain of the man who has made the Keen-Kutter line world-famous, E. C. Simmons, the president of the above-named concern.

Like many another, I have read those lines times without number, and have never given them the thought to which they are entitled, but when the true meaning of those words came to me I thought and pondered over them for many an hour. Men, it's a grand sentence. Think of it and then think of how it applies to you every day. You go to the tailor, get a new suit, probably at a bargain-price, wear it a few times, and it looks shabby. It droops and drags and feels like thirty cents, and you say that you sure got stuck that time, but next time you will know better. On the other hand, if you get a good suit and pay the price for it, you can wear it until you outgrow it or get so tired of it that you give it to some poor devil who needs it worse than you, and every time you see the tailor you tell him that the old suit simply will not wear out, so why buy a new one, and with every pressing it improves in looks, and reminds you day by day that there is no economy in cheap stuff.

So it is in our line. The man who buys a heating plant because it is cheap, has to pay double for the necessary additions to make it right, and the man who gets a jerry-job of plumbing has old Mister Trouble hanging around the house 24 hours of the day, and he, too, has to pay for his experience. Nevertheless, they do not blame themselves because they got stung; they blame the plumbing and heating fraternity as a whole. They class us all together as thieves and robbers, and forget that it was the almighty dollar that they were looking at when they let their contracts.

Therefore, it behooves us one and all, when called upon to estimate a job, to insist on the installation of good material and to get a good fair living price for making the installation. Then, when the job is completed and put into use and gives satisfaction year after year without trouble and expense, that owner is going to recollect the quality and forget the price and you will reap the benefit of the good words he will spread forth. That is the kind of advertising that pays dividends every day. It is an investment and not an expense.

Cheap material means dear labor. Remember that when some fluent-tongued peddler is trying to hypnotize you you into buying a bill of goods on the strength of the price and persists in reminding you that McSwatt is buying the same line of junk in thousand lots. **Do your own buying. Buy because the stuff looks right to you, not to some other fellow. You are the chap who will have to stand back of the stuff in the long run, so look it square in the face and make your choice on merit. It will pay.**

In conclusion, why not adopt Quality. Make your shop and show-room look like quality. Hire quality workmen and insist on quality work, and you will get a quality price for the work you do. Hence, let us ever remember that **"The Recollection of Quality Remains Long After the Price is Forgotten."**

"The Squire."

OBJECTS TO A TRADE.

Editor "Domestic Engineering":—The other day, as I stood waiting for the plumber to get ready to accompany me to my residence to do some work, I happened to pick up one of your papers and, in glancing it through, saw some of your rot about the extreme value of having a trade. Say, Mr. Editor, what in thunder would you condemn our boys to anyway? To be a greasy, sloppy, dirty and many times drunken mechanic? I had a trade myself once and worked at it for 12 years, making anywhere from $30 to $40 each week. In the surroundings I had and the set that I traveled with, I was unable to lay up a dollar. I got out of the city and went in debt for a farm and have now got it paid for and am now running a business in town. A trade and be a mechanic? Not for mine, thank you! There is nothing in it whatever for the most of 'em.

"Farmer."

Probably this man needed the exercise in the open air to round out his life and bring him into the kingdom of plenty which he seems to have arrived at.

We stand for a trade. Not necessarily the plumber's trade, though we cannot avoid leaning that way a trifle, having been brought up to it, but any good trade will do, any trade that the lad seems to fancy. We do not assume that he will work at the trade forever; that is a matter for the future to show. A trade is an anchor to the windward and a joy forever in times of need. Many a lawyer, physician, teacher or preacher we have had say to us, "Oh, if I had only learned a trade." If our mind does not deceive us, we believe that we have observed the statement somewhere that the wages of the average mechanic are far better than the salary of the average man in the classes that we have mentioned. As far as company is concerned, it is a matter of choice, and if our friend traveled too fast it was simply his own fault.

OUTING OF THE MANHATTAN BRANCH OF THE NEW YORK CITY ASSOCIATION OF MASTER PLUMBERS.

The annual outing of the Manhattan Branch of the Master Plumbers' Association of New York City, will be held on Thursday, Sept. 14th, at Glenwood, L. I. The Outing Committee has chartered the steamer "Commander" to take those who can get up early enough, as the boat is scheduled to leave its dock at 8:30 a. m., sharp. For the benefit of those who oversleep, or who really prefer rails to rolls, the Long Island Railroad will also afford transportation facilities. Breakfast is to be served at Glenwood after the arrival of the boat, and then will follow a game of baseball between two famous teams, the "Never Win" and the "Always Licked." There will be other games, and then the event of the day, the Bake, and preparation for the trip home. Tickets can be obtained from the treasurer of the Outing Committee, I. J. Brown, 155 East 58th St.

Scotch Laird (to gamekeeper).—"What terrible weather we have had this summer, Donald!"

Gamekeeper.—"Aye, you're right, laird. Only three fine days in all the summer, an' twa o' them snappit up by Sundays."

Kitchens and Laundries

Their Plumbing, Arrangement, Equipment and Sanitation

By Wm. Paul Gerhard, C. E.

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CHAPTER X.

CHIEF REQUIREMENTS OF A HOSPITAL LAUNDRY.

A good-sized room should serve as receiving room for the soiled wash, and quite often there is a smaller adjoining room devoted exclusively to the officers' linen and to the finer table cloths. The receiving room answers in many cases as the assorting room. It should have a waterproofed floor with floor-drain, its walls should be washable, with all the corners well rounded. Good ventilation should be provided, and it is essential that the receiving room should not have any communication whatever with any part of the laundry containing cleaned cloths.

The wash of patients from infectious wards is necessarily kept entirely separate and at once sent to the disinfecting room of the laundry, or to the disinfecting station if this is located in a separate building.

After being assorted, the wash is soaked preparatory to the washing process. The chief washing operations, the washing, the rinsing and usually the wringing, are performed in the large wash room. This should be a room with high ceiling, well-lighted and ventilated. It should be equipped with the most perfect obtainable washing appliances, comprising not only a large number of set washtubs of solid glazed earthenware or other non-absorbent material for the washing by hand of the smaller pieces, but also the mechanical contrivances known as washing machines, operated either by steam or by electricity. Such power washing machines must be easy to operate and be free from danger to the operatives; with this in view, all exposed dangerous movable parts of their machinery should be well protected by guards. In the machines the wash is soaked, boiled, soaped, washed and rinsed. Sometimes special soaking tubs or rinsing tubs are provided, though they are not really necessary, as the work can be performed equally well in the machines. For the boiling of cloths special copper wash boilers are often provided. In the large hospitals much handwashing is generally out of the question, and a number of hand or power machines are always required, as they save both time and labor. It is always true economy in institutions of all kinds to equip the laundry with the best obtainable machinery and appliances.

After the washing operations follows the wringing, which is done either in special roller wringing machines or else in centrifugal hydro-extractors. The cloths, deprived of much of their moisture, are then taken to the drying room, where they are placed on horses, which slide on wheels in a heated chamber and dried by steam. Drying is accompanied with the best results if done in the open air, assisted by the bleaching effect of the sunlight, but it takes long and is dependent upon weather conditions. Hence, indoor drying arrangements are a necessity. In Europe, continuously moving endless chain drying apparatus seems to be preferred. Round wooden bars are placed over the chain, the wash is hung on the bars, which slowly move forward, and the wash finally drops off on the opposite end of the chamber into cloths baskets.

Being dried, the wash is now ready for the finishing operations, and after being blued and starched, as the case may be, it is sent to the mangling and ironing rooms. The larger pieces, such as bed-sheets, table cloths, etc., are placed in large power mangles or calendering machines, operated by steam or electricity, while cuffs, collars and shirts are finished in special ironing machines. The room where mangling and ironing is done always has a sink where water may be drawn for spraying the wash.

The ironing room should be well ventilated and well lighted, and it is advisable in large institutions to use either gas-heated laundry irons, or else those heated by the electric current.

Now the wash is taken to the packing and repairing room. The mending room should be generous in size. The packing room should be fitted up with a number of open racks, or with slatted or perforated shelves, for the storage of the wash. The shelving should be open to facilitate a good circulation of air over the wash, and closed closets are objectionable. Of course, it is necessary to prevent the dust from settling on the openly exposed wash.

The laundry building should, of course, contain some well-appointed toilet rooms on both floors, and on the upper floor shower baths for the laundry help. In buildings of two stories, the finishing operations are sometimes performed on the upper floor, in which case the lower floor is connected with the upper by means of lifts or convenient endless chain cloths elevators.

The second floor also contains bedrooms for the laundresses, but it should be mentioned that some consider it a violation of sanitary principles to put bedrooms over a laundry.

Illustrations and descriptions of the principal power machines for laundry use will be given further on.

Principal Parts of a Hospital Laundry Building.

From the foregoing it appears that in order to be complete, a laundry building requires the following rooms or divisions for the performance of the various washing operations: a, receiving room for soiled cloths; b, sorting room; c, main wash room; d, smaller auxiliary washroom for staff; e, drying room; f, mangling room; g, ironing room; h, mending room; i, packing, sorting and storing room; j, delivery room for the clean wash; k, toilet rooms; l, boiler room; m, coal room; n, engine room; o, engineer's room; p, workshop, and sometimes q, a disinfecting room.

All these rooms should be made ample in size, and well-ventilated, and should be planned with a view to the future growth of the hospital. If there are two stories, put the rooms for the clean wash on the upper floor. In some cases, the ironing rooms are also placed there. I have already pointed out that the above rooms should be arranged in the order in which the washing operations follow each other. There should be a continuous, direct, and short movement from one washing operation to the next, and the clean wash should not pass through the same room twice, nor should it in any place come into contact with the soiled wash.

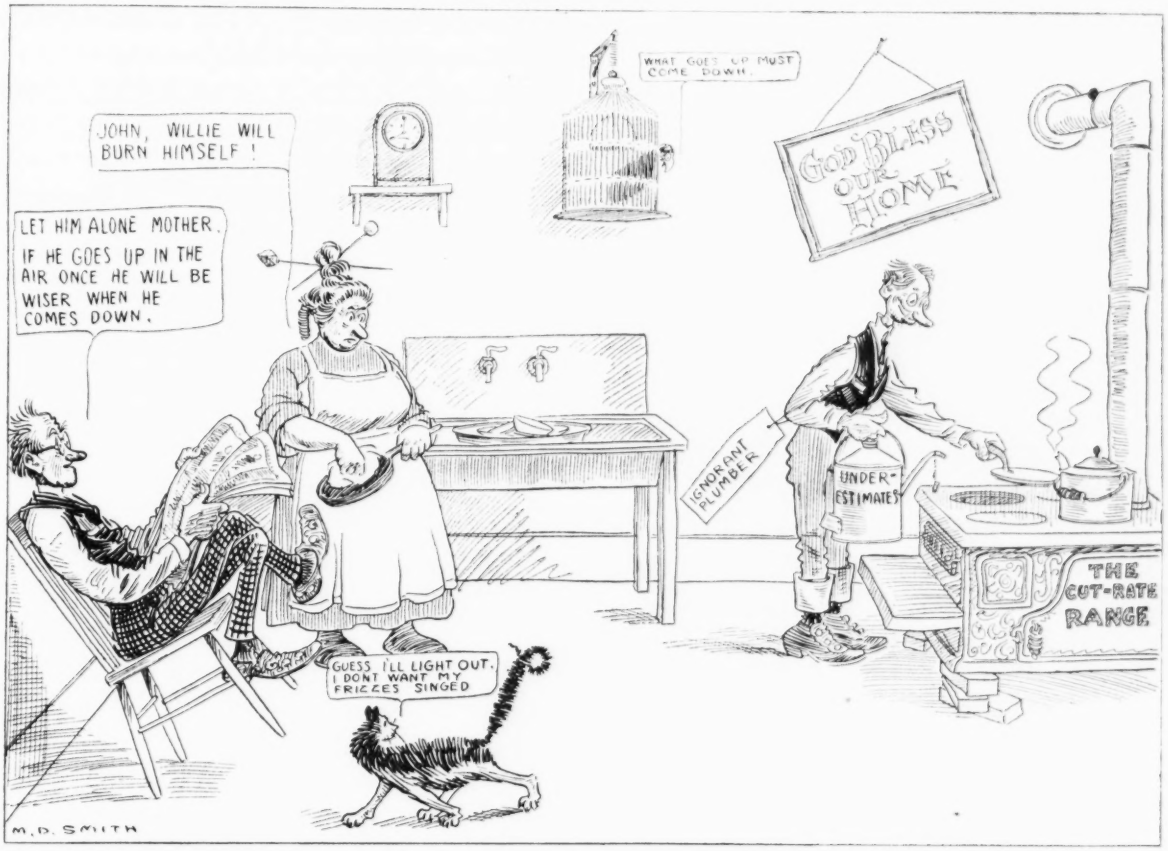
(To be continued.)

Domestic Engineering "First-Aid-to-the-Injured"

Postal Card Cartoon—No. V.

"The Danger of Under-Estimating"

More than 10,000 of our missionary postal-cards have been called for and distributed. Here is another winner that you can use to advantage.


JOHN, WILLIE WILL BURN HIMSELF!
LET HIM ALONE MOTHER. IF HE GOES UP IN THE AIR ONCE HE WILL BE WISER WHEN HE COMES DOWN.
WHAT GOES UP MUST COME DOWN.
GOD BLESS OUR HOME
IGNORANT PLUMBER
UNDER-ESTIMATES
THE CUT-RATE RANGE
GUESS I'LL LIGHT OUT. I DONT WANT MY FRICZES SINGED
M.D. SMITH

EVEN THE CAT GOT WISE!

We have been fortunate in hitting the right spots for the benefit of the trades we represent, but never so fortunate as in the selection of a missionary postal-card cartoon. Not a day passes without a request for these ambassadors of better times. You have often felt that you would like to do something to better trade conditions. Here is your opportunity. Write for 25 or 50 or 100 and evangelize your territory. You can obtain these free of cost. With all the live wires working, curbstone plumbers will have to turn to vending peanuts. The time to get busy is– NOW.

THE KRETSCHMER MFG. CO. SECURES NEW QUARTERS.

The Kretschmer Mfg. Co., Dubuque, Ia., whose plant was recently destroyed by fire, has leased a building at 10th and Jackson streets in that city, and the company is now advising its customers that it is in position to meet their requirements.

THE EASTERN RANGE BOILER & WELDING CO. NOW READY FOR BUSINESS.

The Eastern Range Boiler & Welding Co., which was recently organized at Conshohocken, Pa., announces that its factory in that city is now ready to start operations. The new company is headed by Herbert B. Hallett and it will manufacture galvanized range-boilers and expansion tanks of rivetless construction.

OMAHA SANITARY SUPPLY CO. TAKES OVER JOHNSON-ROWE-PAIGE CO.

The Omaha Sanitary Supply Co., Omaha, Neb., announces that it has taken over the business of the Johnson-Rowe-Paige Co., in that city and will hereafter conduct a jobbing business in plumbing and heating supplies. The new company is headed by Hollis M. Johnson, president, and J. Harold Evans, secretary.

AMERICAN SMOKELESS FURNACE CO. IS INCORPORATED.

Among recent incorporations of special interest to the plumbing and heating trade is to be noted that of the American Smokeless Furnace Co., which has lately received its charter under the laws of the state of Maine. The officers are as follows: President, Clarence E. Eaton; treasurer, T. L. Croteau; secretary, James E. Mantell, all of Portland. The capital stock is announced as $500,000.

INCORPORATED UNDER NEW YORK STATE LAWS.

The Excelovalve Co., 25 W. 42nd St., New York City, has been incorporated under the laws of the state of New York with a capital stock of $500,000 for the purpose of manufacturing flushing valves and water-saving devices. The officers of the company are: E. D. Barrett, president; W. D. Cushman, vice-president; C. I. Wood, treasurer; S. Hartman, secretary; L. Steinfeld, assistant secretary.

HARRY H. HUGHSON NOW PRESIDENT OF THE HUGHSON STEAM SPECIALTY CO.

Harry H. Hughson has succeeded to the presidency of the Hughson Steam Specialty Co., founded by his father, the late Geo. F. Hughson. He is eminently well qualified for this responsible position by training and experience as he has for the last few years been associated with his father in the management of the business. Before this Mr. Hughson was for three years in charge of the Chicago office of the Kewanee Water Supply Co., and has also served as assistant to the master mechanic of the Kewanee Works of the National Tube Co., and as assistant to the chief engineer of the same plant. The Hughson Steam Specialty Co's. factory is located at 5021-5023 South State St., and its sales office at 742-743 First National Bank Bldg., Chicago.

THE H. MUELLER MFG. CO. TO BUILD FACTORY IN CANADA.

Adolph, Oscar and Philip Mueller, president, manager and superintendent, respectively, of the H. Mueller Mfg. Co., Decatur, Ill., have just returned from a trip to Canada, whither they went about two weeks ago for the purpose of selecting a site for a factory for the manufacture of Mueller goods on Canadian soil. They have not yet reached a definite conclusion as to the most advantageous point at which to locate. They visited a number of places, were everywhere warmly welcomed, and each place vigorously urged its claims of superiority. In every city visited they found favorable conditions confronting them, but their final decision may not be reached for some time. Naturally there are numerous considerations which will ultimately influence their choice, but the one which will carry the greatest weight is a location which will not only meet the existing conditions contingent upon shipping facilities, fuel, labor, etc., but will be equally satisfactory in the future.

At the present time from 60 to 70 of the company's 900 employes are kept busy on goods for the Canadian trade, which means that the new factory will start with that number of employes. The company believes that this force will be doubled for the second year, and it will gradually increase as the business develops. The members of the company see no obstacle in the way of developing their Canadian plant to proportions equaling the parent company.

THE BELER WATER HEATER CO. PASSES INTO NEW HANDS.

The Beler Water Heater Co., Pittsburgh, Pa., manufaoturers of automatic instantaneous water-heaters, automatic storage systems, etc., has been re-organized by the election of new officers and directors on August 14, 1911, as follows: James Hay, president; John Ellis, vice-president; W. J. Langenheim, secretary and treasurer; Adolph Beler and Edward Schreiner. James Hay, the new president, was, until recently, as is well known, president of the Ruud Manufacturing Co., Pittsburgh, since its inception. Mr. Ellis, the new vice-president, was superintendent of the Ruud Manufacturing Co's. factory for years and many of the improvements in automatic water-heaters are the result of his ideas. Mr. Beler has been connected with the Beler Water Heater Co. since its incorporation ten years ago and he has done much to bring the automatic water-heater to its present state of efficiency. W. J. Langenheim was until recently secretary and treasurer of the Ruud Mfg. Co., and he has a large acquaintance in the trade. Edward Schreiner is a prominent Pittsburgh attorney.

The Beler Water Heater Co. has built up an attractive business and its heater is well and favorably known in the trade. It has been developed along entirely new and original lines. Every vital feature, such as the thermostat, the water-valve and the burners, is entirely different in construction from the ordinary automatic water-heater.

It is the intention of the new directors to increase the capital stock to $250,000 and secure a larger factory until the lease expires on the large factory building at 29th & Smallman streets, Pittsburgh, owned by Mr. Hay. Busi-

ness will be gone after vigorously and new branch sales-offices have already been established at Baltimore, New York, Philadelphia, Toronto, Canada, Columbus, O., Chicago, St. Louis, Kansas City, Los Angeles and San Francisco. Other sales-offices will be established as rapidly as possible until the country is entirely covered with a high-class sales-organization.

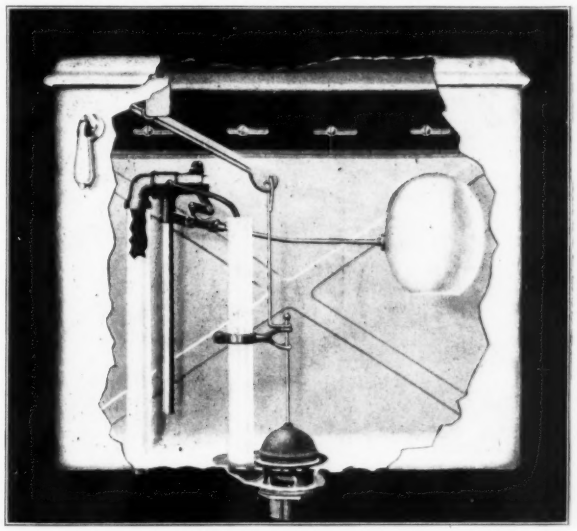
TEN DOLLARS FOR A NAME.

The John Wood Mfg. Co., Conshohocken, Pa., will pay $10 to the plumber who gives it the best suggestion for a title of a new monthly publication devoted to the interest of "Electric Weld" products, made by this company. The company plans to issue such a paper in the near future and it will select its title from names and ideas submitted by plumbers. All letters containing suggestions should be addressed to the Advertising Manager, John Wood Mfg. Co., Conshohocken, Pa., and they should be mailed so that they will reach him before October 15, 1911.

THE "KAZOO SIMPLEX" WATER-CLOSET TANK.

The Enameled Tank Co., Kalamazoo, Mich., is specializing on a water-closet tank without a joint, made of American Ingot iron and known as the "Kazoo Simplex." This tank is manufactured under more than a dozen patents, all the inventions of Carl H. Zwermann, president of the company, who is of the opinion that it is the only tank that has no brass working parts under water. The ball-cock enters through a porcelain-enameled tube integral with the tank, as shown in the accompanying illustration, and it can be taken out when the tank is full of water. The overflow tube is also porcelain-enameled and integral with the tank. The valve-seat is level with the bottom of the tank, thus eliminating all chance for mud to collect in the tank, as all sediment will be washed out with each flush. The tank has adjustable wallhanger, and with the "Kazoo" opal glass float open on bottom can never leak or fill. Its interior construction and its attractive appearance are shown in a most clear manner in the accompanying illustrations and interested parties are invited to write for full particulars to the manufacturers, the Enameled Tank Co., Kalamazoo, Mich. When doing so kindly remember to mention that "Domestic Engineering" gave you the tip.

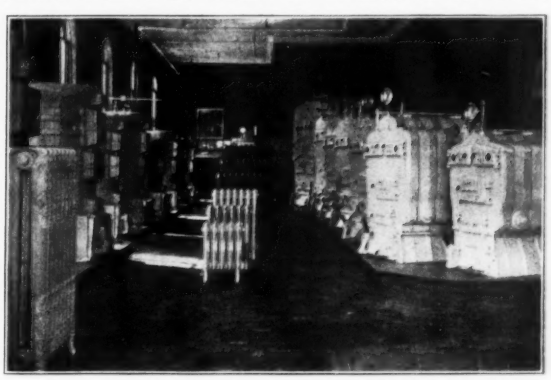
Closet Combination with the "Kazoo Simplex" Tank.



Interior Construction of the "Kazoo Simplex" Tank.

HEATING DISPLAY ROOM OF THE NATIONAL SUPPLY CO., TOLEDO, O.

Some people have an idea, to judge from their showrooms, that it does not matter much how they arrange their goods—boilers and radiators are for service and cannot be attractively displayed, as other smaller articles can. To all such, we especially commend the new display-room in the heating department of the National Supply Co., Toledo, O., as an example of what can be done in this line. Our illustration, unfortunately, cannot do justice to the really artistic color-scheme carried out in the decorations of the boilers and radiators and their surroundings, but it can, and we trust will, help some perplexed dealer to a better arrangement and spacing of his stock. The unique display here pictured is the original idea of the manager of the heating department, H. S. Gardner.



Up-to-date Heating-Goods Display of the National Supply Co., Toledo, Ohio.

THE "NEUERINIT" TORCH.

The Globe Gas-Light Co., 37-39 Union St., Boston, Mass., makers of a number of different styles of kerosene and gasoline torches and furnaces for plumbers' use, have a handy torch named the "Neuerinit," holding one quart of gasoline. The flame-tube and gasifier are of gun-metal, with a regulating-spindle of German silver and pump of drawn brass. This size can be used to soft-solder large objects and the full flame will melt copper-wire of ⅛ in. diameter in less than three minutes. Complete descrip-

The "Neuerinit" Gasoline Torch.

tion and price list can be obtained on application to the manufacturers. Tell them "Domestic Engineering" told you.

THE TURNER ALCOHOL DOUBLE-JET BLOW-PIPE.

The Turner Brass Works, Sycamore, Ill., are manufacturers of the Turner double-jet alcohol blow-pipe No. 50, herewith illustrated. This appliance is of special interest because it produces an intensely hot needle-pointed blow-pipe flame, which can be adjusted to different sizes, thus making it useful for many kinds of work. The burner is mounted on a compound swivel, so that the flame can be pointed in different directions. No foot-bellows are required for producing this blast flame, as the air pressure is forced into the tank by means of the pump in the handle, thus maintaining a steady blast flame of about 3,000 deg.

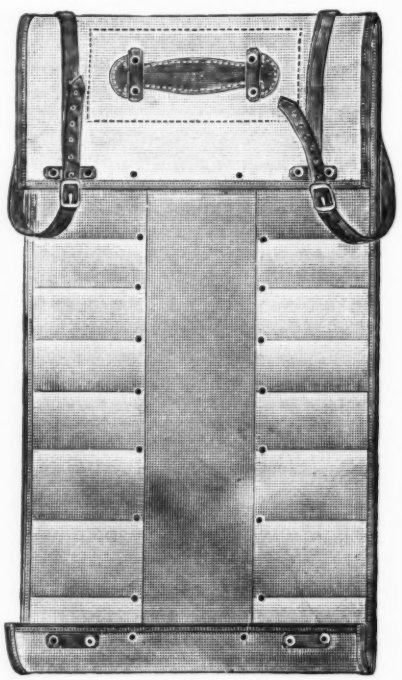
It will be seen that this appliance has a wide range of usefulness in the mechanical trades, as well as for laboratory work, and is recommended for fine soldering,

The "Turner" Double-Jet Alcohol Blow-Pipe.

tempering, annealing and similar work. The flame is clean, and does not corrode the metal, making it excellent for such work as lead burning, gold and silver soldering, and for other purposes where a clean non-oxidizing flame is needed. This is one of a large variety of double-jet blow-pipes and torches constructed to use both gasoline and alcohol as fuel, which are manufactured by the Turner Brass Works. These blow-pipes have been favorably known to the trade for several years and have been recognized for producing an exceptionally high degree of heat. They are made for fine work and also for extra heavy work, such as automobile brazing, etc.

A TOOL-ROLL FOR PLUMBERS AND STEAM-FITTERS.

Every plumber must have some means of transporting his tools, but not every plumber knows what to buy to get the greatest satisfaction in use. The Excelsior Bag



A Handy Plumbers' Tool-Bag.

& Mfg Co., Troy, N. Y., offers him a serviceable roll with a place for everything he is likely to need. Our illustration shows the construction of this roll, which is made of strong "excelsiorated" white canvas, with pockets of the same material, sewed securely and also fastened by rivets. The case is furnished with two strong russet leather straps, and a leather handle is riveted to the bag, making it easy to carry. The leather binding with which the edges are finished adds greatly to the general appearance. Further particulars are given in the illustrated folder which the makers will gladly send you if you tell them you saw this in "Domestic Engineering."

WAKEFIELD BRASS CO. TO BUILD.

The Wakefield Brass Co., of Vermillion, O., will soon erect a fireproof building costing $6,000. The company is engaged in the manufacture of gas fixtures.

Questions and Answers.

"Please, Mr. Editor," wrote a correspondent of an Irish paper, "can you tell me how to prevent bleeding at the nose?"

"To prevent bleeding at the nose," replied the Irish editor, "keep it out of other people's buisness."

Magistrate (sternly).—"Didn't I tell you the last time you were here I never wanted you to come before me again?"

Prisoner.—"Yes, sir; but I couldn't make the policeman believe it."

Smokeless Heating Boilers

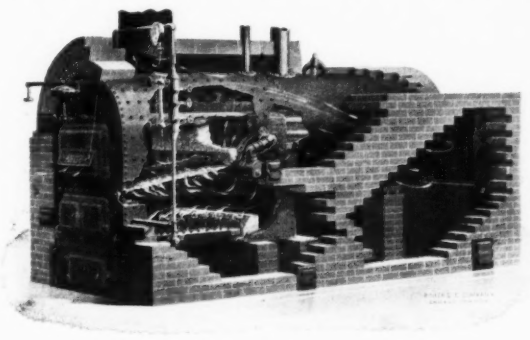
It may be stated as a general proposition that abatement of smoke means economy in fuel consumption. In these days when manufacturers find that it pays to put experts at work to improve their methods of running all departments, from handling the raw material to putting the finished product in the hands of the consumer, smoke prevention appeals at once to the pocket-book nerve. But it appeals to other nerves as well. The excess of smoke in the air of any large city, even in the most select residence streets, is not only an annoyance but a positive source of danger to health. We believe that municipal authorities are justified in requiring the abatement of this nuisance, just as they are in regulating any other factors that are detrimental to public welfare. When people realize their right to pure air, and that they are entitled to a clean atmosphere just as much as they are to clean, well-paved streets and other sanitary conditions for which an up-to-date city makes provision as a matter of course, we shall have laws enacted and enforced by popular insistence and we shall wonder why we so long tolerated the former unreasonable imposition on the rights of the many by the few.

But this prevention of smoke by law cannot come without education, and there is no better way than to begin at home. Do the boilers you install pollute the surrounding atmosphere? If so, you are not blameless in the matter. Are you doing your best to educate your customers? Do you know why some boilers are a nuisance to the unfortunate neighbors, while others are a joy and subject of congratulation to the residents of that district? If you don't know these things, why don't you? There are few subjects of greater importance to civic welfare at the present time than this question of smoke prevention. Again and again we have heard it said: "Oh, I just had to move out of that part of the city. I couldn't stand the smoke. It choked us, and then, the damage to the curtains, the carpets, everything in the house, was something dreadful. You've no idea of the saving in money and time now we're out of that dirt." You may not realize it at first, but every time a desirable citizen moves out, some undesirable one is sure to come in, and it is not long before property values deteriorate to a marked degree, to say nothing of the loss to the surrounding merchants, whose trade deserts them with the ebb of population.

Realizing the importance of the subject, "Domestic Engineering" has grouped together in this issue illustrations of some of the leading makes of smokeless boilers now on the market, and has endeavored to call attention to the principles upon which the manufacturers have worked. It is impossible in our limited space to mention all the details, but you can obtain full information upon application to the makers, most of whom you will find represented in our advertising pages.

THE "KEWANEE" SMOKELESS FIRE-BOX BOILER

The Kewanee Boiler Co., Kewanee, Ill., has done its share to give dwellers in large cities freedom from the inconvenience and expense that follow, all too often, the

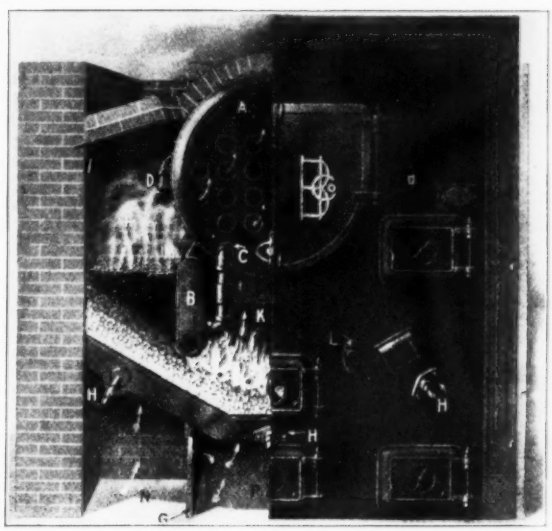


The "Kewanee" Smokeless Fire-Box Boiler.

increase in population through the corresponding increase in the number of smoking chimneys. The regular "Kewanee" firebox boiler has a place on the list of the "near-smokeless," but this company is not satisfied with a prefix, and so is making now a firebox boiler with a smokeless furnace. Our illustration shows a sectional view of this type. The greater part of the coal is consumed on the upper grates, which are water-grates, the lower row catching the fall from the upper portion. The draft travels from the door over the top body of coal, is drawn down through the fire on the water-grates, and then over the hot coal on the lower grates. By the time this travel is accomplished, the gases have lost the carbon with which they were laden, and it has not had the opportunity to pass out into the air in the form of smoke. The company states that careful tests by smoke commissions in many of the cities now waging a steady fight on the smoke-evil, have proved that the "Kewanee" smokeless fire-box boiler will take care of any kind of fuel without the shadow of a doubt—or of smoke.

THE HERBERT SMOKELESS BOILER.

The Herbert Boiler Co., Root and La Salle streets, Chicago, manufactures a smokeless boiler whose principle of operation is shown in the accompanying illustration. As indicated by this sectional view, in the Herbert boiler the fire is built upon a center grate, and is supplied from two coking magazines, one on each side. In the coking process, the natural draft draws the gases backward and down over the bridge-wall into the smoke-chamber, marked R in our illustration. From R, following the arrow,

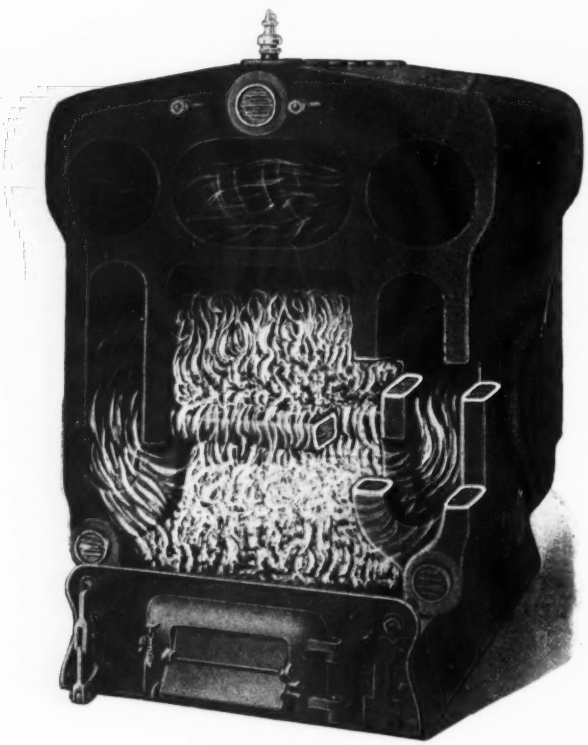


Sectional View of the Herbert Smokeless Boiler.

the gases travel into the central ash-pit, F, and up through the intense heat of the clear fire on the central grate, uniting there with the air-supply to the stack. This union of the smoke and valuable gases with incandescent fire, adds greatly to the heating efficiency of the boiler. The oscillating grate supplies the center fire with live coals from the bottom of the coking-magazines, as needed. The side grates are pitched to the center, each bar a single rib, which in action has a chopping movement, thus keeping the fire clear and free from ash. Under the grates is a pit divided into three sections, each compartment with separate doors. The draft is controlled by the doors under the magazines, and access to the ash-pit is obtained through the doors under the central grate, which may also be opened on occasions when it is desired to check the fire to a greater extent than usual. The Herbert smokeless boiler is so carefully designed and constructed that its manufacturers garantee it to comply with the most stringent regulations for the prevention of smoke, and to burn the cheapest grade of soft coal with most satisfactory results when the bills for fuel are compared with those for non-smoke-consuming plants.

THE CRIPPS DOWN-DRAFT SMOKELESS BOILER AND ITS CONSTRUCTION.

To meet the demand for a heating boiler that will burn soft coal of any grade with the elimination of the smoke nuisance, the Prudential Heating Co., of Akron, O., about three years ago placed on the market a boiler of sectional cast-iron construction, known as the Cripps down-draft smokeless boiler. There is nothing new or untried in any of the basic principles of the construction of this boiler, says the manufacturer, except the combination of the down-draft fire-pot occupying a position in the center of the section and operating in conjunction with the ordinary up-draft fire at the base of the boiler. By uniting the two fires the combustion is of such a nature that coal is consumed with but very little smoke, and 90 per cent of the time with practically no smoke at all. The accompanying illustration, which shows this boiler with



Sectional View of the Cripps Down-Draft Smokeless Boiler.

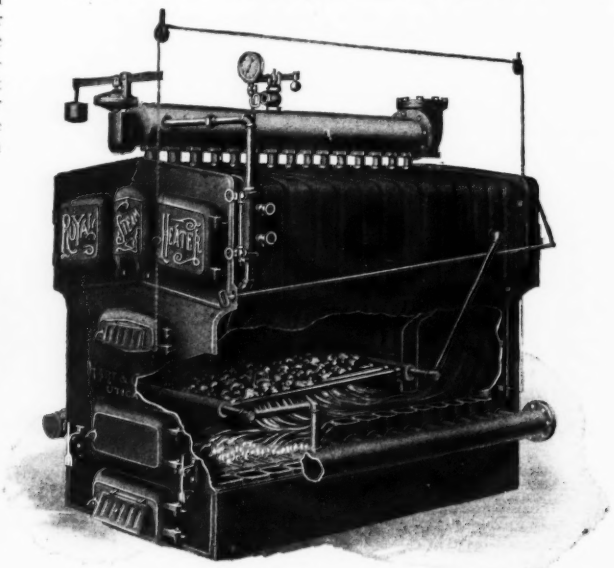
the front section removed, gives the reader a clear idea of its interior construction. In this case the fire-pot is 24 in. wide and the cross arm of the section forms a water-grate, while the lower fire-pot has a 36-in. rocking and dumping grate with an ash-pit below. The Prudential Heating Co. makes these boilers for both steam and hot water, 12 sizes each. For steam with capacities from 1,800 to 7,800 sq. ft.; for hot water from 3,000 to 13,000 sq. ft.

The illustration shows in a marked way the generous grate-area and amplitude of actual fire-surface, these being, of course, conducive to great increase of boiler-efficiency.

An interesting feature of the smoke-box construction is that in case of extreme low fire, the operator can obtain direct draft through both fire-pots. The literature of the company presents other illustrations of the Cripps down-draft smokeless boiler, notably a back view showing smoke-box with direct-draft damper, check-damper and the hand-holes in the ash-pit.

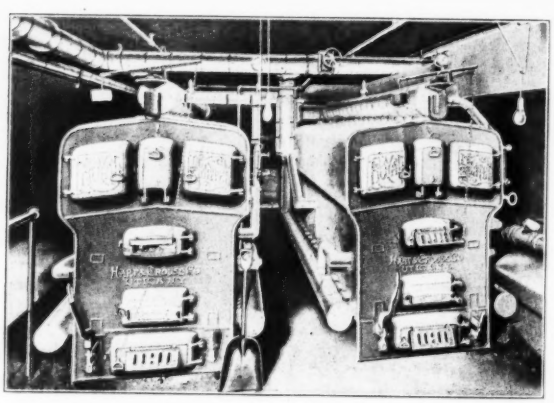
THE "ROYAL" SMOKELESS DOWN-DRAFT BOILERS.

The Hart & Crouse Co., Utica, New York, and Chicago, are manufacturers of the "Royal" boiler, which has stood the test of service during the past three seasons with most gratifying results. These boilers are said to prevent absolutely all objectionable smoke production and to secure a very great saving in the amount of fuel consumed. In the "Royal" boiler, a sectional view of which is shown in the first illustration, the down-draft combus-



Sectional View of the "Royal" Smokeless Boiler.

tion is supplemented by several valuable features, among which may be specified the following: All connections between the water-tube grate and the boiler are on the outside of the boiler, rendering the grate entirely independent of the latter; as the water-tube grate is constructed in two parts, either half can be introduced or removed through the fire-door of the boiler; the steam-



Battery of "Royal" Boilers, Heating the Vendome and Rowe Hotels in Minneapolis.

ing capacity of the boiler and consequently the rapidity of circulation, are greatly increased by this construction of the grate; all dirt and sediment can be drawn off by means of special plugs on the outside of the boiler, placed on the water-tube connections; the efficiency of the down-

draft combustion through the water-tube grate is aided by a lower grate, so located that all partially consumed coal falling from the upper grate is caught and burnt upon this, with an up-draft admitted to the base of the boiler. The junction of the two fires in the boiler in the intervening chamber, furnishes the final stages of a perfectly smokeless combustion. Our second illustration shows two "Royal" boilers set in battery, in the Hotels Vendome and Rowe, Minneapolis, Minn. The Hart & Crouse Co. are on the honor roll of manufacturers who stand behind their goods with a positive garantee. They have such confidence in their "Royal" boilers that they are willing to garantee that these boilers can be operated successfully with any grade of soft coal without producing objectionable smoke.

THE UNDERFEED "FAVORITE" BOILER.

The Williamson Foundry Co., 335-339 West Fifth St., Cincinnati, O., is another company which has made an effort to meet the ever-increasing demand for heating boilers of the smokeless type. Its product is known as the Williamson Underfeed "Favorites" boilers. The characteristic feature of these boilers is the feeding device. Instead of throwing fresh fuel upon the fire to smother or smolder, all the coal is fed from underneath, and is easily pumped through the coal chute into the fire-pot, underneath the fire, as shown in the accompanying illustration. The fresh coal is surrounded on all sides as well as covered on the top by flames. Smoke and gases released by combustion are consumed by passing up through the fire and converted into heat, thus being turned into practical account in increasing the warmth of the building, instead of going up and out of the chimney to decorate the landscape with smudgy splotches. Neither are the flues burdened with soot, which hangs down in long strings choking the draft and greatly decreasing the heating qualities of the boiler. This fact also eliminates the frequent cleaning of flues, a very disagreeable task. These boilers are made for both steam and hot water, in 15 different sizes each; for steam with a capacity from 450 sq. ft. to 1,650 sq. ft. and for water with a capacity from 750 sq. ft. to 2,725 sq. ft. Their construction is such that they are easily handled and installed. They are made in sections, the largest of which can easily be taken through an ordinary-sized door or cellar-way. This feature in no way lessens the efficiency of the boiler, as each part is so accurately made that they fit together exactly, forming permanently tight joints. The manufacturers state that the perfect combustion of these boilers, consuming all smoke and gases, effects a saving of ½ to ⅔ of the coal bills.

The Williamson Underfeed "Favorite" Boiler.

Another noteworthy feature of the operation of the underfed construction is the pushing of all ashes and clinkers to the outer edges of the grate and their deposition on a special hood, or plate, around the clean-out opening. By removing this plate, ashes or foreign matter may be raked directly into the ash-pit. The company's catalog is written in convincing manner and illustrates all the meritorious features of construction of this type of boiler.

FUEL-SAVING HEATING SYSTEM.

A saving of from 10 per cent. to 50 per cent. in fuel, a more even distribution of heat and a more flexible control to suit mild or severe weather are said to be among the many advantages obtainable from the Moline vacuum-vapor heating system.

This system is really a compound of the good features of both vacuum and vapor-heating. It operates either or below atmospheric pressure. In ordinary winter weather a building may be kept comfortable with the system operating at vacuum. As is shown by numerous test charts taken direct from boiler gages, the Moline system operates below atmosphere very nearly all of the 24 hours. Only at firing-up times, when more steam is necessarily raised, does the gage show even atmospheric pressure.

What such a sensitive system as this means in fuel-saving can well be imagined, as it takes less coal to keep the steam below atmosphere than it does to maintain several pounds of pressure all the time, as is necessary to operate an ordinary steam system.

In severe weather hardly enough steam to show on the boiler gage need be carried to heat the home or building, but as much pressure as is needed may be carried in extremely cold weather.

Another feature of the Moline vacuum-vapor heating system is the absence of automatic radiator-valves, as all the air from the whole system is discharged through a single large air-trap and vacuum-valve located at the end of the circuit in the basement out of the way. The water of condensation returns by gravity to the boilers. The action of the air-trap and vacuum-valve is entirely automatic, and the whole system requires no attention from beginning to end.

When all air has been discharged from the piping through the air-trap the vacuum-valve closes against its return, sealing automatically by the force of outer pressure against the inner vacuum. It operates just as naturally as the sun shines or the rain falls and it has no expansion parts or volatile fluids.

The ample opening in the air-trap allows the air to escape without friction and explains why all of the air can be expelled from the system without an ounce of pressure showing on the boiler gage.

There is no waste of time in heating a building with this system after it is once in operation. In the morning when the smouldering fire is stirred up the steam rises instantly and circulates to every part of the system because there is little air in the pipes to retard it.

Each radiator is individually throttled so that as much or as little steam as may be desired can be admitted to various parts of the building. This feature also allows the distribution of heat to be equalized among radiators at all distances from the boiler.

The manufacturers of this heating system furnish detailed plans and specifications for each heating plant in which their equipment is used. These plans are drawn by heating engineers of long experience in planning jobs of all kinds, and do much to insure complete efficiency.

The Moline system consists only of the air-trap and vacuum-valve, compound pressure vacuum-gage, ejector and supply and return valves, and there are no boilers, piping or radiators sold with the Moline equipment. A handsome descriptive booklet will be sent by the manufacturers, the Moline Vacuum-Vapor Heating Co., Moline, Ill., to interested parties upon application, mentioning "Domestic Engineering."

THE METAL MARKET

PIG-IRON QUIET.

In spite of the fact that pig-iron production is only two-thirds what it was two years ago, about the period of maximum production, the demand is not in excess of the supply and consumers are not making contracts for forward delivery, believing that lower prices will prevail. The present decline in the pig-iron market has already run longer than usual and Southern iron in Cincinnati has been selling for considerably over a year at less than $15. Whether pig-iron manufacturers will have to accustom themselves to a new level of prices such as were in vogue from 1903 to 1908, is a question, but, at all events, many furnaces in the country are unable to make iron to sell at the present figure unless there is some readjustment in the matter of wages. Consumers seem to be able to dictate their own terms and show little or no interest in buying for forward delivery. Prices in New York are higher than a month ago, but otherwise quotations are without change as follows:

No. 2 Southern foundry, Birmingham	$10.00 to $10.25
No. 1 Northern foundry, New York	15.50 to 15.75
No. 2X Northern foundry, New York	15.25
No. 2 plain Northern foundry, New York	14.75 to 15.50
No. 2 Northern foundry, Chicago	14.50 to 15.00

OLD IRON.

The market is considerably weaker and the consumers of steel scrap have apparently secured all the material necessary for their requirements. Prices have been reduced from 25 to 50 cents per ton with the exception of malleable castings and stove plate, which are without change. Quotations are as follows:

No. 1 yard wrought, long	$11.00 to $11.50
No. 1 yard wrought, short	10.00 to 10.50
Heavy-melting steel scrap	10.50 to 10.75
Machinery cast	10.50 to 11.00
Wrought pipes and tubes	10.25 to 10.50
Malleable castings	10.50 to 11.00
Wrought turnings	7.00 to 7.25
Cast borings	6.50 to 7.00
Stove plate	8.50 to 9.00
Light iron	4.25 to 4.75

COPPER SALES AT CONCESSIONS.

Sales of copper to domestic consumers have been fairly large but they have been at concessions from the recently ruling prices. Electrolytic has been sold at 12.50 cents and this continues to be the quotation. Lake, although in little demand, is without change at 12.75 cents. The exports continue large in spite of labor troubles in Europe and amounted to 20,000 tons for the first 23 days of the month.

MORE TIN AVAILABLE.

Although no steamers have sailed from London with tin aboard, there are reports that tin is coming from the continent on direct steamers and this will replenish the supply, sadly depleted by the labor troubles in Great Britain. The premium for spot tin forced the price as high as 46 cents, but sales have since been made at 43.50 cents.

LEAD.

The market in St. Louis is slightly easier and sales are now being made at 4.42½ cents. In New York the demand is only fair, the price being 4.50 cents.

SPELTER.

The principal demands continue to be for quick shipments of spelter and these can be satisfied at 6.10 cents New York, and 5.95 cents St. Louis, which is a decline of 10 cents per 100 lbs., compared with last week.

CONTRACTS RECENTLY AWARDED.

Albion, Mich.—The board of education has awarded the contract for plumbing the Chas. F. Austin school to Spears & Schofield, their bid being $1,580.

Manhattan, Kan.—Hull & Son have the contract to install new heating apparatus in the city hall. Their bid was $459.75, only 25 cents lower than that of Lloyd Day. The highest bid submitted was for $519.

Aurora, Ill.—Kohlert & Harter, W. Main St., have secured the contract for the steam heating plant for the Irwin building, the contract including the opera house. Work has already been begun on the contract, which amounts to about 4,400 ft. of radiation, to be installed at a cost of $2,000.

Joliet, Ill.—The Barrett Hardware Co. has received the contract for heating and plumbing in the new Becker apartment and store building on the corner of Cass and McRoberts streets.

Chicago, Ill.—Barrett & McCall of this city have secured the contract to equip the Montgomery Ward building with "Chi-Fau-Co." drinking fountains.

Syracuse, N. Y.—Frank Leavery, 306-308 East Water St., has been awarded the contract for the installation of a steam-heating system in Mrs. W. B. Harlow's new residence in this city.

Paw Paw, Mich.—C. F. Snow & Co. have been awarded the contract for the plumbing in Fred Kimball's new house.

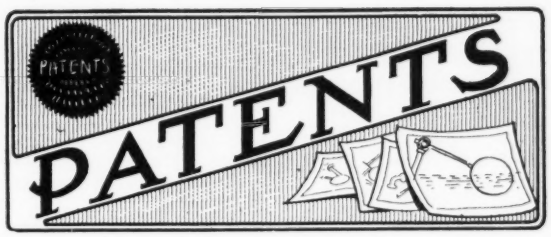
NEWS FROM UTAH.

Salt Lake City, Utah.—Midgley Bros. have recently completed the plumbing and heating installations in several large buildings, among which may be mentioned the Salt Lake Stock Exchange, Semloh Hotel, Kimball apartments, Orphans' Home, New Grand Hotel, Stratford apartments, Armour & Co., and the Albert Hotel. They report good prospects for business this fall.

Salt Lake City, Utah.—W. A. Bywater has been awarded the contract installing a complete plumbing system in the new Empress Theater on S. Main street. Each dressing-room will be equipped with lavatory and toilet-rooms complete with shower-bath. The stage will have a complete sprinkler system. The cost is about $4,000. Mr. Bywater has just finished a contract in the Z. C. M. I. building for the plumbing system and vacuum heating system, the contract amounting to $10,000.

Dixon, Ill.—Robert Nelson's plumbing shop was badly damaged by fire recently, his greatest loss being the burning of his auto truck, on which he carried only a small insurance. The repairs to the building, it is estimated, will amount to about $400. It is believed that the fire was caused by spontaneous combustion from oily waste, or else by crossed electric wires.

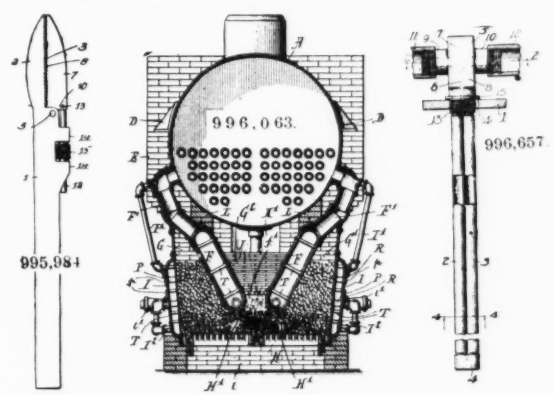
Binghamton, N. Y.—The board of managers of the Susquehanna Valley Home at a recent meeting approved and accepted the drawings and specifications submitted by Architect W. H. Whitlock for a new laundry and heating plant. Bids will soon be asked for the installation of a new heating system, including a 100-h.p. boiler, underground steam-piping to the main building, the school and the hospital, and a complete heating plant for the hospital.



Heating Department.

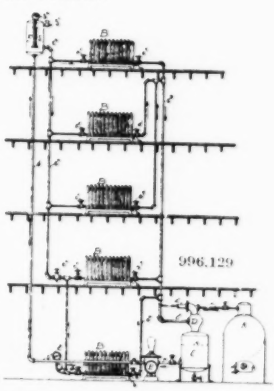
995,984. Pipe-Wrench. Joe Pedery, Trenton, N. J. A wrench of the type described embodying a shank adapted to serve functionally as a handle, a longitudinally-extending alligator jaw integral with and projecting from the outer end of said shank and having one side thereof serrated or toothed, the width of the inner terminus of said jaw being less than the width of the outer end of the shank, the outer end of said shank to one side of said jaw having a recess, an adjustable jaw having one side thereof serrated or toothed and adapted to co-operate with the jaw of said shank and further having a portion of its inner terminus bifurcated, an apertured lug carried by the inner end of said adjustable jaw and fitting in the recess of said shank, a pin mounted in said shank and adapted to pivotally retain said lug within said recess; a screw having the forward end thereof loosely and pivotally connected to the said bifurcated portion of the adjustable jaw, apertured enlargements projecting from one side of said shank and adapted to receive said screw, and a knurled nut rotatably mounted upon said screw between said enlargements and adapted to move said screw relatively to said enlargements, substantially as described.

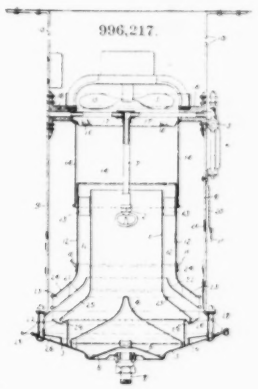
996,063. Smokeless Boiler-Furnace. John Cook, Buffalo, N. Y. A furnace comprising a boiler, a grate beneath said boiler, water-jackets forming the sides of the space between said boiler and said grate, a combustion-chamber centrally in said space, a fuel-chamber at each side of said combustion-chamber, said fuel-chamber at each separated from said combustion-chamber by intervening imperforate walls themselves separated from each other and having their lower ends spaced from said grate and their upper ends in contact with the boiler, and water connections between said water-jackets connected to high and low points of said boiler.



996,657. Heater or the Like. Frank Rogers McGregor, Chicago, Ill. The combination with a receptacle for containing a heated fluid, of an auxiliary heater comprising a head formed with a pair of separate chambers, said head having its lower portion threaded into an opening in the wall of said receptacle, separate pipes leading from the separate chambers of said head and projecting into said receptacle, and means for connecting the inner ends of said pipes, said pipes lying within the plane of the outer walls of the threaded portion of said head, said pipes being parallel and in juxtaposition to each other throughout their length, said pipes and said head thereby being removable together, through the opening into which the head is threaded.

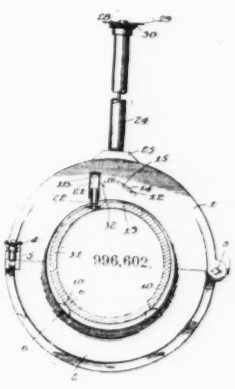
996,129. Hot-Water Heating System. Cassius Carroll Peck, Rochester, N. Y. In a hot-water heating system, a circuit comprising an air-tight elevated receiver, means for heating water located below the receiver, a pipe connecting the heating means and the receiver, a plurality of radiators located at different levels between the receiver and the heating means, connections between the receiver radiators for supplying hot water to the latter, the outlet for said connections being below the top of the receiver so as to leave a body of air in the upper portion of the receiver, return connections between the radiators and the heating means, said connections rising from the radiators to a point near the level of the receiver and then descending to the heating means, and a pump for forcibly circulating the water through the circuit defined.

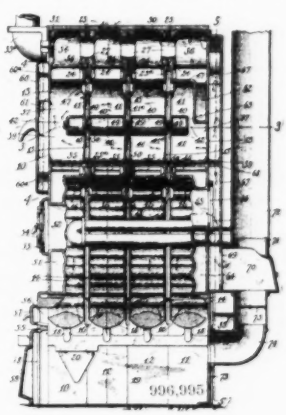




996,217. Humidifying and Air-Moistening Apparatus. Stuart W. Cramer and William B. Hodge, Charlotte, N. C.; said Hodge assignor to said Cramer. A humidifier comprising an inner and outer casing, a spray head within the inner casing, a conical deflector, a pan, an annular bell-shaped member between the casings and arranged to form an air passage inside and an air passage outside said bell-shaped member, the latter passage being adapted to deliver air beyond the edge of the pan, and an outward extending spray passage below said air passages.

996,602. Pipe-Cutter. Frank A. Anderson, Buffalo, N. Y., assignor of one-half to William D. Allen, Buffalo, N. Y.



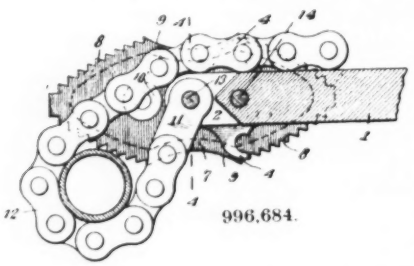


In a rotary pipe-cutter, detachably connected pipe surrounding members, rotary cutters and a work-engaging roller mounted upon the inner circumference, an operating handle mounted upon the outer circumference, ratchet teeth upon the outer circumference, and a reversible ratchet tooth carried upon the handle adapted to co-act therewith to rotate the cutter in one direction and upon reversal in the opposite direction.

996,995. Water-Heater or Boiler. William C McKeown, Buffalo, N. Y., assignor to Buffalo Radiator Co., Buffalo, N. Y., a corporation of New York. A water-heater or boiler comprising a front section, a rear section, and one or more intermediate sections, all in communication, said sections having body-portions forming the top

of a fire-box and depending side water-legs forming the sides of the fire-box, said body-portions having central heat-openings separated by transverse water-tubes which lie in contact to form superposed longitudinal heat-flues, the transverse water-tubes of the front and rear sections being of less depth than said sections to provide connections between the ends of said heat-flues, each section having a transverse water-tube at its lower end connecting said water-legs, a crown-chamber at its upper end, and substantially vertical water-tubes separated by heat-flues which open at their upper ends into the upper longitudinal heat-flue and at their lower ends into the top of the fire-box, said vertical water-tubes connecting the transverse water-tubes at the lower ends of the body-portions with the crown-chambers, and said rear section having a water-chamber depending from its crown-chamber and terminating centrally of the transverse water-tube separating its central heat-openings and being separated from said transverse water-tube by a narrow passage.

996,684. Chain-Wrench. Albro M. Tilton, New York, N. Y. A chain-wrench having a slotted handle, a double-ended reversible jaw-plate on each side of the handle, two bosses on each side of the handle at different distances from the end of the handle and fitted within corresponding countersinks in the inner faces of the oppos-



996,684.

ing jaw-plates, each jaw-plate having in its inner face a third countersink to engage, when the jaw-plate is reversed, the boss which is the more distant from the end of the opposing handle prong, and chain-hooks on the bossed section of the handle, and a pivot-pin for the chain arranged concentrically with the bosses which are the nearer to the end of the handle.

Plumbing Department.

994,432. Water-Heater. Baldwin Vale, Stockton, Cal. A water-heater comprising a hollow, substantially hemispherical water jacket provided with a corrugated heating surface and a service inlet in its lower portion, a hollow, substantially hemispherical water-jacketed dome of greater diameter than said water-jacket, also provided with a corrugated heating surface, service connections between said water-jacket and said dome, a substantially hemispherical shell depending from said dome, a space being formed between said shell and said jacket, said space communicating with the hollow of said dome, said shell being provided with an opening to receive a burner, an upright flange to inclose said burner, and a vent tube set within the top of said dome and extending downward and provided with perforations near the top thereof.

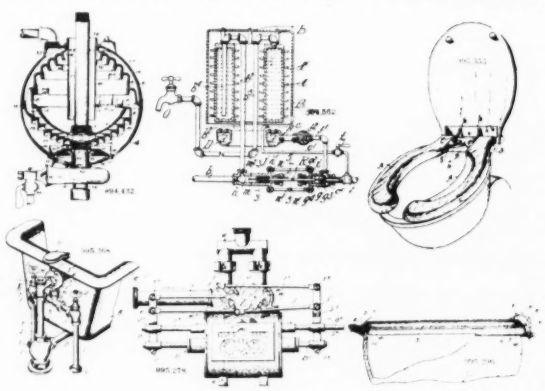
994,562. Water-Heating Apparatus. John B. Beauvais, Holyoke, Mass. In a device of the character described, the combination with a water receiving chamber, of a cold-water service-pipe discharging thereinto, a burner beneath said chamber, a casing disposed in and forming a part of the cold-water supply-pipe line, a piston mounted in said casing, a gas valve casing disposed in alinement with the piston containing casing, a rod connected to said piston and extending into the gas valve casing, a gas valve carried by said rod and serving to control the flow of gas through said casing, said rod, said piston and said gas valve being capable of both reciprocatory and rotative movement, and a locking member carried by said rod which serves, when said rod is rotated to one position, to hold the gas valve in its open position.

995,355. Closet-Seat. William M. Kurtz and Milton R. May, Athens, O. A water-closet seat having two seat sections separate from one another throughout their length, a pintle constituting the pintle of the hinge by which the seat is united to the water-closet, and comprising a shouldered central portion by which the two seat sections are spaced at the desired interval apart, pintle sections or rods extending from opposite ends of the shouldered central portion, on which the seat sections are mounted, and clamping means at the outer extremities of the pintle rods between which and the shouldered central portion of the pintle, the seat sections are severally tightly pressed and held, said clamping means being independently adjustable for the purpose of regulating the clamping action upon their respective seat sections as desired substantially as hereinbefore set forth.

995,368. Plumbing-Fixture. Leo H. Pleins, Chicago, Ill., assignor to James B. Clow & Sons, Chicago., Ill., a corporation. A plumbing fixture having, in combination, a tub having an overflow opening, an overflow pipe having a horizontal portion communicating with the overflow opening of the tub and a vertical portion extending downward therefrom, a discharge spout and fittings through which the discharge spout is supplied with water, said fittings including an annular fitting located in a vertical plane between the vertical portion of the overflow pipe and the tub, the horizontal portion of the overflow pipe being surrounded by said annular fitting.

995,278. Water and Gas Meter. James J. Mulhall, Albany, N. Y. A gas and water meter comprising a cylinder with apertures in the ends thereof and having a plurality of compartments, a piston in each compartment having a stem movable through the aperture in the respective end of the cylinder, valve casings each having ports communicating with the respective compartment of the cylinder, a discharge pipe communicating with said casings, a cut-off valve in each casing, a meter register, a crank arm fixed to each cut-off valve, a guide-bar fixed to each piston stem and connections between said guide-bars and crank-arms, a rotable register operating mechanism, pivotal rods connecting the latter and said guide-bars, as set forth.

995,296. Closet-Seat. Edward Schindler, Brooklyn, N. Y. A seat for closet-bowls comprising a sheet of metal centrally apertured, a depending flange carried by the seat and adapted to overhang the edge of the bowl, a fiber ring mounted upon the top of the seat and completely sur-

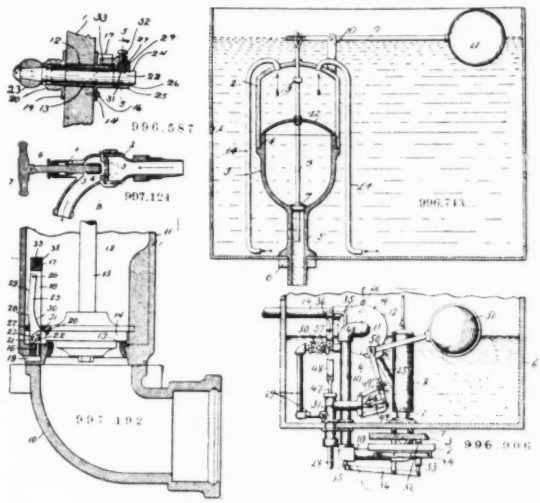


rounding the aperture, means for securing the ring to the seat, cushioning means covering said securing means and adapted to cushion the seat against the bowl, a cover for said seat comprising a sheet of metal having a depending flange to surround the ring and rest on the seat, and means for pivotally supporting the seat and cover on the bowl.

996,587. Operating Mechanism for Valves. John F. Jennings, Cleveland, O., assignor to The Monarch Brass Co., Cleveland, O. In mechanism of the character described, the combination with a tank having an outlet and a valve closing said outlet, of a screw-threaded sleeve arranged in the wall of said tank and provided with a flange near its inner end arranged to abut against the inner face of the wall of said tank, a nut adapted to engage the outer end of of said sleeve and clamp against the outer face of the wall of said tank, a shaft rotatably arranged within said sleeve and provided at its outer end with a handle, a collar secured on the inner end of said shaft, a trip lever slidably mounted in said collar and means connecting one end of said lever with said valve.

996,743. Ball-Cock. George R. Yancey, Louisville, Ky.

The combination with a tank, and its inlet, of a vessel in the tank to which the inlet is connected, a valve in the vessel controlling the flow from the inlet into the vessel, an actuating stem carrying said valve and extending from the vessel, a partition carried by the stem within the vessel, said partition being spaced from the wall of the vessel, and an outlet pipe connected to the vessel, and having its discharge end in close proximity to the bottom of the tank.



996,906. Ventilating System for Water-Closets. Kirk S. Blanchard, Rochester, N. Y. In a ventilating system for water-closets in combination with a bowl and a flush-tank, a fan, a water-motor for the fan discharging into the tank, a water supply-pipe having a passage leading to the motor and another passage leading directly into the tank and separate valves for said passages.

997,192. Valve Mechanism for Street-Hydrants. Claude L. Howes, Boston, Mass. A street-hydrant comprising a casing provided with an internal main valve and seat, and a waste port communcating with the interior of said casing, a waste valve for said port, an actuator arranged to open and close said waste valve, and means connected with the main valve for operating said actuator, said waste valve and actuator being free to move independently of the main valve when the latter is unseated.

997,124. Automatic Valve-Closure for Water Cocks or Faucets. Virgilio Lopez Garcia, Buenos Aires, Argentina. A cock or faucet, comprising a body formed of two parts secured together, one part having a triangular opening, a rubber disc having incisions therein and secured between the said parts over the opening, and a screw rod mounted in one part and adapted to enter the opening thereof and engage the rubber disc to expand the same.

GOVERNMENT CONTRACTS TO BE AWARDED.

Supervising Architect James Knox Taylor, Treasury Department, Washington, D. C., will receive sealed proposals as follows:

Until 3 p. m., Sept. 15, 1911, for the construction complete, including plumbing, gas-piping, heating aparatus, electric conduits and wiring, and lighting fixtures, of the U. S. post-office at Pendleton, Ore., in accordance with drawings and specifications, copies of which may be obtained from the custodian of the above site or from the office of the Supervising Architect at Washington, D. C.

The time for opening bids for the completion of the fourth floor in the U. S. post-office and court-house at Grand Rapids, Mich., has been extended from Aug. 31st to Sept. 14th.

The time for opening bids for the mechanical equipment (excepting elevators and mail-handling apparatus) for the U. S. post-office at Washington, D. C., has been extended from Sept. 15th to Oct. 10th.

THE FURMAN SECTIONAL BOILER

The famous Furman Boiler won its reputation for quality years ago. One of the first of cast iron Boilers to be placed upon the market in the early days of the heating industry, it has been held very highly ever since by the leading heating contractors. Its changes in construction have served to advance its merits as an economical, efficient and convenient boiler to erect and operate.

The improved practices of manufacture that have been used in the production of

THE COMPLETE LINE
OF
United States Boilers

as a result of the concentration upon the separate plants of all the skill, experience, and ability of the manufacturing geniuses of the consolidated companies has advanced the quality of the Furman Boiler to an even higher level.

FURMAN SECTIONAL BOILER
21 SIZES. STEAM and WATER

Our standard catalog "THE COMPLETE LINE", and special literature on Furman Boilers should be in your possession. Write today.

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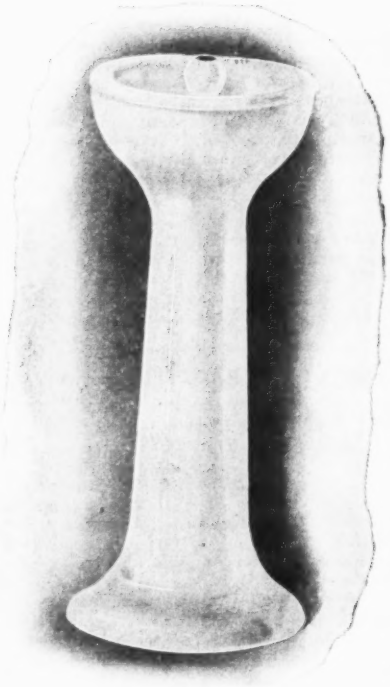

It is a well-known fact that millions of bacteria infest public drinking receptacles of every description.

Those more commonly known to all of us are the ones producing tuberculosis, pneumonia, diphtheria, tonsilitis and blood poisoning.

Statistics show that these diseases increase the death rate in large proportions, millions of dollars and an immense amount of time being spent each year to perfect cures for them. In a great number of cases their origin may be traced to the common public drinking cup.

We know nothing about cures but in the cut herewith illustrated we offer a preventive. This sanitary drinking fountain is sanitary in every respect. As illustrated it is enameled all over and fitted with a porcelain enameled bubbling cub, which can be arranged for a continual or self-operative flow. This fountain can also be furnished with a N. P. brass self-closing valve with a china jet, both of which are absolutely sanitary.

The fountain is 30 inches in height and has a separate bowl 13¼ inches in diameter and 5¼ inches deep, fitted on the pedestal.

We are making other styles of drinking fountains which will be illustrated and described in the near future.

Union Sanitary Mfg. Co.

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